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AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power / *Published by the Air Force Association*

HICKAM FIELD, DECEMBER 7, 1941

MUST THE PAST BE PROLOGUE?

12 Rescued From Burning Plane Before 100,000 Spectators

THREE PERSONS WERE KILLED, 12 others injured, when this Air Force transport crashed during a recent air show at Wilmington. The Kaman H-43B helicopter, left, maintained its position so that the helicopter downwash could blow the flames away from the cabin. Officials said the helicopter assisted rescue operations and helped save more serious injuries to the passengers. At right, military personnel and civilians man a fire-fighting truck.
Photo By — Phil Morgan WECT-TV

QUICK THINKING AND COURAGE OF OFF-DUTY HUSKIE RESCUE TEAM PREVENTS FURTHER TRAGEDY

WILMINGTON, N. C. — The dramatic rescue of 12 men from a burning C-123 transport which crashed before 100,000 horrified spectators at an air show in Wilmington, N. C., Sept. 24, 1961, has been credited to the courage and skill of an H-43B HUSKIE crash-rescue helicopter crew trained in Air Force fire-rescue techniques. Newsmen in Wilmington and Air Force firemen, working in the flaming wreckage, have said the effectiveness of downwash from the rotors of the hovering helicopter made it possible for rescue workers to toil for as long as 15 minutes freeing trapped passengers.

The Kaman H-43B HUSKIE from Seymour-Johnson Air Force Base, N. C., was assigned to the air show for a static display. It was not on duty for crash emergencies. Crew of the Helicopter was Capt. J. C. "Jack" Armstrong, Jr., pilot; 1Lt. Charles Morrill, co-pilot; SSgt. Donald H. Holloman and A1C Gene Mayo, both crash rescue specialists, and Capt. Charles Pummill, flight surgeon.

When the crash occurred, the H-43B crew was sitting outside their aircraft watching the show. Within two minutes the crew had pushed the helicopter out of the display area and were air-borne on the way to the crash scene. Capt. Armstrong hovered the helicopter over the nose of the burning aircraft, blasting rotor downwash through broken cockpit windows. Firemen were able to enter the stricken plane. They reported that the helicopter downwash was funnelling through the length of the fuselage, keeping it clear of smoke, fumes, heat and flames.

Rescue personnel worked for 10 minutes freeing victims trapped in the cockpit and for as long as 15 minutes in the mid-section of the plane extricating an Army sky-diver who had been pinned by wreckage.

At one point in the 20 minute drama, Capt. Armstrong landed his helicopter to discharge the rescue men and flight surgeon. In that brief moment smoke billowed through the stricken plane, overcoming a fireman working in the rear of the fuselage. Moments later the helicopter was air-borne, once again driving volumes of fresh air through the crash wreckage.

The fireman who was momentarily overcome reported he could feel the blast of clean air sweep the fuselage free of choking smoke and heat. The fireman was hospitalized briefly after his experience.

The H-43B evacuated three critically injured survivors to the hospital when its fire suppression job was complete. During the trip a civilian doctor performed a tracheotomy on one patient who was unable to breathe. The operation was performed in-flight with the doctor using a crewman's survival knife.

At the hospital Capt. Armstrong made a vertical descent down the side of the tall hospital building, rotors clearing the building by six to eight feet. He landed the helicopter on one half of a tennis court.

Firemen from Seymour-Johnson Air Force Base manning a fire truck loaned for the air show, played a major part in suppressing flames at the rear of the crashed C-123 and working ceaselessly inside the aircraft freeing trapped personnel.

Nearly 100 HUSKIES are on duty with Air Rescue Service, MATS, at Air Force bases throughout the nation. Air Rescue Service is responsible for the Air Force local base rescue mission, a mission which is designed to meet this type of emergency.

KAMAN salutes the Air Force and its crash-rescue teams who are **always** on the alert to protect the men who are protecting our country.

If you would like more information on the Air Force's crash-rescue protection technique, write:

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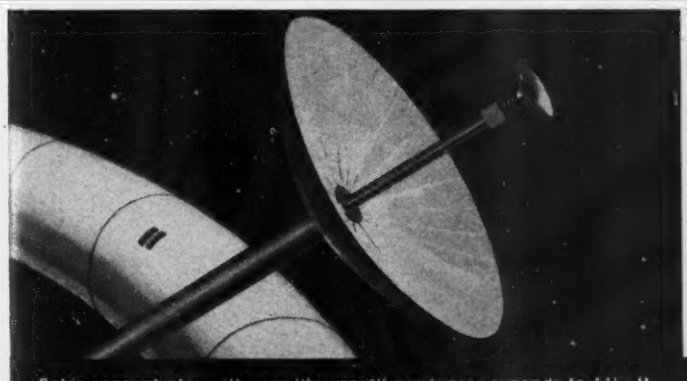
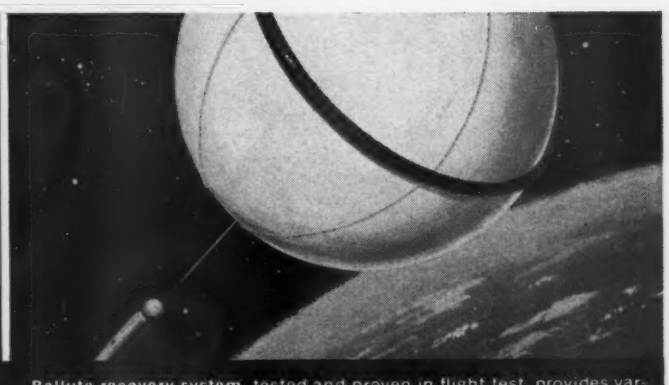


Solar concentrator with new "trumpet" condenser expands to 44½-ft. diameter. Design has been thoroughly tested for space environment.



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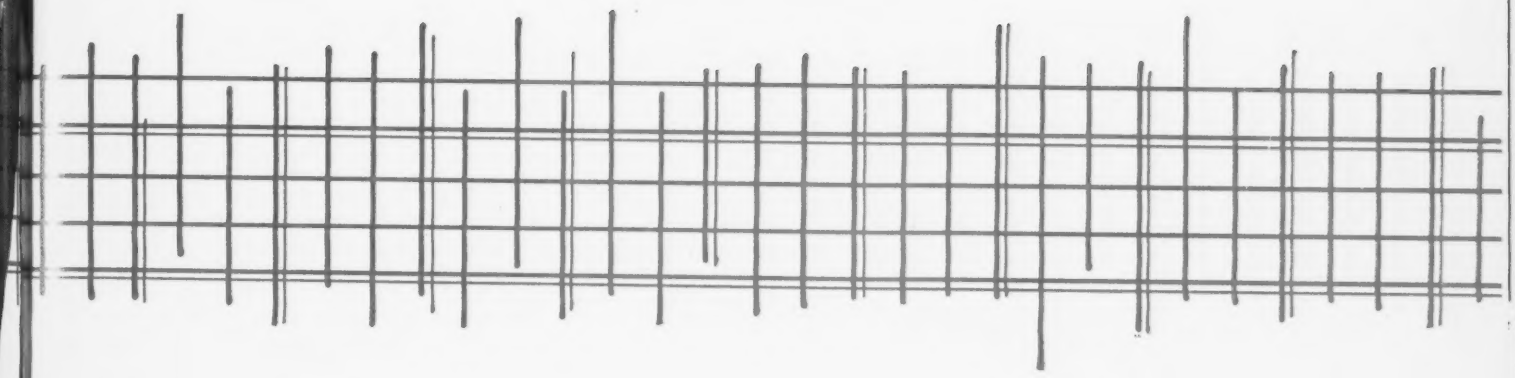

genus: homo · species: sapiens discipline: factors engineering

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The Magazine of Aerospace Power / Published by the Air Force Association

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and **SPACE DIGEST**

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AIR FORCE Magazine and SPACE DIGEST are published monthly by the Air Force Association. Printed in U.S.A. Second class postage paid at Dayton, Ohio. EDITORIAL CORRESPONDENCE AND SUBSCRIPTIONS should be addressed to the Air Force Association, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. Telephone, FEderal 8-6575. Publisher assumes no responsibility for unsolicited material. CHANGE OF ADDRESS: Send us old address and new address (with zone number, if any) to Air Force Association, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. Allow six weeks for change of address. Send notice of UNDELIVERED COPIES on Form 3579 to AIR FORCE Magazine, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. SUBSCRIPTION RATES: $5.00 per year, $6 per year foreign. Single copy 50 cents. Association membership includes one-year subscription: $6.00 per year (Cadet, Service and Associate membership also available). ADVERTISING CORRESPONDENCE should be addressed to Sanford A. Wolf, Director of Marketing, AIR FORCE Magazine and SPACE DIGEST, 501 Madison Ave., New York 22, N.Y. (PLaza 2-0235). New England office: Morley L. Piper, Resident Manager, 428 Essex St., Hamilton, Mass. (HOward 8-4600). Midwest office: Paul J. Jones, Suite 1310, 105 S. LaSalle St., Chicago 3, Ill. (STate 2-1265). Los Angeles office: Harold L. Keeler, Sales Manager and William H. McQuinn, 625 S. New Hampshire Ave., Los Angeles 5, Calif. (DUnkirk 5-1436). San Francisco office: Mark M. Hurd, 201 Town & Country Village, Palo Alto, Calif. (DAvenport 6-2920). Detroit Office: Kenneth J. Wells, 801 S. Adams Rd., The Adams Plaza, Birmingham, Mich. (MIdwest 7-1787). European representatives: Brayton Nichols, 151 Fleet St., London E.C.4, England. TRADEMARK registered by the Air Force Association. Copyright, 1961, by the Air Force Association. All rights reserved. Pan-American Copyright Convention.

Secretary of Commerce Hodges says—and we agree with him—that we must automate to stay alive, that is, take advantage of the many new systems now available for the simplification and speeding up of repetitive operations that till recently took so much human time and energy. But progress ain't all that easy, Mr. Secretary. We are finding out, for example, that as we switch over our membership fulfillment service from a metal stencil system which has been maintained at McCall's—our printer in Dayton, Ohio—to an electronic punchcard system maintained in our Washington offices, there are some unhappy foul-ups.

The best we can say to our members everywhere, especially those whose records are temporarily fouled up, is that we are sure everything will soon fall back into its proper place. Inevitably, during a transition from one system to another, there are mixups. The most common one right now involves the member who pays his dues, is very rapidly and efficiently and automatically credited here in Washington by our new electronic systems—but who also has to be checked off the old list still in Dayton. We know that some members have been billed once, twice, and even more times than that for dues they have already paid. They certainly don't like it, and we don't blame them, and the only reason it has happened is that the old system is still being phased out at Dayton, and until it is phased out, some members will be on two lists—in Dayton and in Washington, certainly a dubious privilege. Soon, probably in about a month, we are assured by the people who handle this specialty for us, everything will be straightened out. Everyone will be on the automated list. Everyone will be billed properly. The new electronic system is designed to be a vast improvement over the old one. Once it gets going into full operation, we're sure you will agree. Till then, we can only thank you for your forebearance, and urge you to pay your dues—just once—no matter how many bills you get.—J. F. L.

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Rendezvous in space, once a science-fiction dream, is now increasingly recognized by the experts as an essential tool of the US lunar program, as the key also to *all* long-term, manned space missions, military and civil.

SPACE DIGEST

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The primary purposes of American space efforts are peaceful, but in a tense world, we cannot ignore the defense potential inherent in astronautics.

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The competition for brainpower is intense, and our full educational resources must be applied to meeting new needs.

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An inquiry from a lad in Muskegon Heights, Mich., points up increasing interest in questions of space sovereignty, a subject being studied now on high government levels.

NATO Must Be Born Again / BY PAUL L. PEETERS 73

A noted defense scholar urges that the Atlantic Alliance achieve "unity through diversity," that only by stressing individual national sovereignty and choice can NATO attain a vitally needed rebirth of strength and vigor.

"Nonprofits"—Who's Got a Better Way? / BY CLAUDE WITZE 78

The aerospace age requires a careful balance of managerial skill and true objectivity. Nonprofit corporations are the government's answer to this need, and no one yet has suggested a better way.

"So Well Remembered". . . December 7, 1941 / A PHOTO REPORT 91

Twenty years ago this month the forces of Imperial Japan struck at the American fleet at Pearl Harbor. It was a day that, in President Roosevelt's words, "will live in infamy." Here is a photo reminder.

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An Editorial

THE IRRESPONSIBLES

By John F. Loosbrock
EDITOR, AIR FORCE/SPACE DIGEST

CURRENTLY, the defense debate in this country is being muddied by the activities of two groups, which are poles apart politically but which have more in common than either would care to admit.

One group, which William White, writing in *Harper's* magazine, terms the "Reactionary Irresponsibles," sees the Red threat as primarily an internal one, with government and the entertainment and information media shot through with Communist sympathizers. They equate social progress with socialism and socialism with communism. They see the country as dangerously vulnerable to subversion on the home front and well-nigh friendless abroad. Big public expenditures, they say, are part of the plot, designed to lure this country into sacrifice of individual liberty and to undermine the economy so the Reds (the ones who live next door) can TAKE OVER.

At the opposite end of the political spectrum are what Mr. White calls the "Precious Irresponsibles," who also see the big threat as internal but coming from a sinister alliance of America's military and big business. They pursue the old and, we thought, discredited "merchants-of-death" hobgoblins of the '30s. They say there is no threat from without except as it is manufactured by generals who want more stars and industrialists who want more money.

Both of these extremes, we submit, are doing the nation a grave disservice, sowing dissension with lies and half-truths. The Reactionary Irresponsibles accuse our civilian leadership of softness toward communism. The Precious Irresponsibles criticize our military leadership for hardness. Both, in playing hide-and-seek with internal plots and cabals, conveniently ignore the external threat—the implacable rocket-rattlers in the Kremlin.

In facing these extremists, Americans who tread the sensible middle path must simultaneously fend off the unjustified attacks of the one without accepting the unwelcome embrace of the other.

We have a personal stake in this matter. Our concern with the state of the nation's defenses, our belief that communism cannot in the long haul coexist with freedom, competitively or otherwise, our firm conviction that freedom, if the choice must be made, is infinitely more precious than peace, invites approbation from the Reactionary Irresponsible, approbation that is as unwanted as it is misdirected.

But if unwarranted approval from the Reactionary Irresponsibles is embarrassing, undocumentable accusations from the Precious Irresponsibles are resented.

Take, for example, a column recently distributed by the New York *Herald Tribune* syndicate, written by John Crosby, erstwhile television critic, now turned pundit.

In the column Crosby slips easily from a discussion of the General Walker incident to a quotation from former President Eisenhower's speech decrying the growing power of the military-industry combine, to a special issue of *The Nation* magazine on the same subject. Then, in a guilt-by-association gambit as neat as any turned by Joseph McCarthy at his peak, Crosby comes to the Air Force Association. He writes as follows:

> "One of the most arrogant, jingoistic, and downright alarming recent military utterances, terribly revealing of the military mind which would dearly love to employ some of this hardware it has amassed at so much expense, is the policy statement of the Air Force Association, which is supported by the missile industry and mostly staffed by retired officers."

COMMENT: This neatly attempts to equate AFA with warmongering, with the political views of General Walker, with the so-called military mind, and with the military-industry alliance which somehow—to this type of mind—is a greater threat to free institutions, than is Mr. Khrushchev. If AFA can be said to be supported by the missile industry, it is in the same sense that Mr. Crosby is supported by Macy's and Gimbels and the used-car advertisers in the papers that print his column. In fact, if Mr. Crosby desired to preserve his own purity, presumably he should refuse to allow publication of his column in media which accept missile-maker advertising or indeed "big-business" advertising in general. And our Washington staff boasts only one retired Air Force officer, Jack Rambeau, who joined us on September 1 of this year. Crosby, as a highly paid interpreter of public events, is entitled to his own opinion, but his careless handling of the facts indicts his credibility as a reporter.

Crosby then quoted from the AFA Statement of Policy with comment as follows:

> "'Complete eradication of the Soviet system must be our national goal—our obligation to all free people,' says this Statement in part.

In short, the military is declaring war on Russia and Red China right now in advance of Congress or the President."

COMMENT: Crosby avoids the accusation of quoting out of context with the saving words "in part." However, in selecting this one sentence, he failed to include the last phrase, ". . . our promise of hope to all who are not free." But let's stay with the fragment that he did quote and assess it against the conclusion to which he leaps so agilely. We fail to see anything "arrogant, jingoistic, or downright alarming" in a sincere belief that freedom and the Soviet system cannot coexist indefinitely. The AFA Statement calls for eradication of the Soviet *system.* It does not call for eradication of Russia, or of Red China, or of the Russian or Chinese peoples, nor does it call for war or any overt act against any of these. But how any American with a grain of sense can view recent events in Southeast Asia, in Berlin, and, most of all, the callous disregard for everything decent in international relations evidenced in the series of Soviet nuclear tests—how any American can add these and a dozen other examples together and conclude that the free world can profitably put faith in anything but its own strength—this eludes us. Perhaps Crosby has an answer. If so, he is derelict in his duty as a citizen in withholding it from consideration by the President and the National Security Council. He found further cause for alarm in the AFA Statement. He writes:

"The other significant sentence, terribly revelatory of the impatience of the high brass with us 'little people,' is: 'National policy must prescribe that the choice between nuclear and nonnuclear weapons is neither moral nor political but is essentially a military consideration.' In sum, the brass wants to be able to push the fateful button plunging mankind into thermonuclear war by itself without any annoying interference by the President or Congress. The brass would like to get rid of this 'moral and political' control and push the button when it chooses."

COMMENT: Here Crosby obviously is the victim of ignorance rather than vicious intent. The fact is a nuclear weapon is not necessarily the multimegaton device that the Soviets have been detonating. A nuclear weapon is not even necessarily a thermonuclear weapon (H-bomb). Nuclear weapons range the destructive scale from a fraction of a kiloton (a kiloton equals a thousand tons of TNT) to many megatons (a megaton equals a million tons of TNT). It is at least highly debatable as to whether employment of a small, fractional-KT, tactical nuclear weapon in a limited-war situation would "plunge mankind into a thermonuclear war." We don't happen to think it would, and we think it grossly unjust to intimate, as did Crosby, that we know it would but we don't care.

Crosby might have performed a real service had he quoted one more passage from the Statement, the passage that read:

"There is no reason to believe that nuclear weapons, no matter how they may increase in numbers and ferocity, mark the end of the line in military systems development. New weapons, *more selective in application and less destructive of life and property,* may come into being. Their possession by one side and not the other could surely break a nuclear stalemate in a dramatic fashion." [Italics supplied.]

There is no interest among the military, not the men we know at any rate, in killing for the sake of killing or in destruction for the sake of destruction. If that were so there are many nonnuclear ways to go about it—napalm, fire-bombing, biological warfare, or the old-fashioned bayonet. Nor need a thermonuclear weapon be dropped on a city to achieve destruction. It can merely be exploded in the air above Siberia to destroy the wills and erode the spirits of those who love peace more than they do freedom. Mr. Khrushchev is well aware of this. Obsessive fear of war can destroy this nation, as we know it, just as surely, if more slowly, than can war itself.

Crosby might have done better had he quoted the words of the Commander in Chief, the man who should and does have the responsibility for pushing that button. In his letter to the Air Force Association Convention, President Kennedy addressed the problem this way:

"Thus we face, in the short run and the long, a wide range of military and diplomatic challenges by a strong and determined adversary. *We must be prepared to respond to these challenges across a wide spectrum of capability, taking full advantage of the flexibility of modern weaponry to deter aggression, but also, if necessary, to fight and win against it."* [Italics supplied.]

This is what the AFA Statement of Policy adds up to—"to be prepared to respond . . . if necessary, to fight and win."

In his Veterans Day address at Arlington Cemetery, the President spelled it out further:

"No man who witnessed the tragedies of the last war, no man who can imagine the unimaginable possibilities of the next war can advocate war out of irritability or frustration or impatience.

"But let no nation confuse our perseverance and patience with fear of war or unwillingness to meet our responsibilities. We cannot save ourselves by abandoning those who are associated with us or rejecting our responsibilities.

"In the end, the only way to maintain the peace is to be prepared in the final extreme to fight for our country and to mean it."

Possibly these sentiments also are arrogant, jingoistic, downright alarming by Crosby's definition and by the definition of the Precious Irresponsibles. If so, we believe the great majority of the American people would reply, "We couldn't care less."—END

AF Buildup

Gentlemen: The Air Force has acted to call up organized Reserve and ANG units to help support the force buildup required by the international situation. . . .

Not all of our manpower requirement will be met by these units. There is an additional requirement to bring on board relatively large numbers of individual Reserve officers to fill future needs for career officers in the active force. We anticipate that some officers and airmen from the recalled units may be kept after completion of their specified tours if they so desire, and if they meet the long-range standards of the Air Force. . . .

We must enlarge the pool of officer applicants for recall to extended active duty. Our basic, and urgent, need at this time is for the career-minded lieutenants and captains who left the service at their own request, who (a) possess baccalaureate or higher degrees, and (b) who are nonrated or, if rated, willing to return on nonflying status. The numerical requirements are such that we will consider all career fields.

Since our objectives could conceivably rise still higher, our criteria might alter at some future time; therefore, officers who do not fit exactly the picture I have outlined should nevertheless submit their application for recall. . . .

LT. GEN. E. J. TIMBERLAKE
Deputy Chief of Staff, Personnel
Washington, D. C.

Correction from the Distaff Side

Gentlemen: In the October '61 issue of AIR FORCE/SPACE DIGEST, "Aerospace World" section, I read with interest the article concerning the successful recovery of the Discoverer XXIX capsule. The story stated the pararescue men parachuted from a C-119. Actually, an SC-54 of the 76th Air Rescue Squadron was responsible for deploying the pararescue men to the scene. Both TSgt. Leote M. Vigare (not SSgt.) and SSgt. William V. Vargas are assigned to the 76th. A1C Charles Hoell, Jr., was TDY from the Rescue Squadron, Okinawa.

I am sure all the members of the 76th would appreciate a correction of the article.

Thank you for your very informative magazine each month.

MRS. JAMES E. HINKLE
Honolulu, Hawaii

Prototype Price Tag

Gentlemen: Your item on page 34 of your September issue ["Airpower in the News"] concerning my alleged "deliberate misinformation on price tags" in my recent article in the *Naval Institute Proceedings* warrants a reply on my part.

The two statements you objected to were that each of the first two prototypes of the B-70 would cost nearly $1 billion each, and that the cost would average $437 million each for the first sixty-six planes.

The last statement is not correct, but it was not deliberately misstated by me. In proofreading the article, I inadvertently missed the decimal point. I arrived at the $43.7 million figure by dividing the stated $3.1 billion cost (in the 1961 budget hearings) by sixty-six. At the time of writing, the $75 million each figure you quote was not published, and actually I feel that it includes too much of the capital investment figure in the context you used it.

The article was prepared prior to the hearings on the Kennedy budget. I used the 1961 hearings which contemplated two fully combat-ready prototypes. The Kennedy budget proposed three "prototypes" at $1.3 billion ($433 million as you state for each). However, according to Mr. Symington's testimony in the Senate, and Mr. McNamara's testimony in the House, an additional $2 billion (Senate) or $1.4 billion (House) would be necessary to give the Kennedy budget prototypes a combat capability. The word "prototype" is obviously open to interpretation as used in successive years, and I don't feel guilty of misrepresenting price tags by my original statement of "close to $1 billion."

As you know, the article did not discuss the pros and cons of the B-70 system, per se. I used the B-70 as an example of what I consider redundant expenditures . . . in our strategic nuclear deterrent posture when compared to the obvious material shortcomings in what we generally style as our "limited war forces." Since the great B-36 controversy, not one atomic or nuclear bomb has been dropped in anger . . . a tribute to our deterrent posture . . . but four times as many American men have been killed in battle than were killed in the Revolutionary War, the War of 1812, the Mexican War, and the Spanish-American War, *combined.*

My thesis still stands. I firmly believe we should divert far more funds to our limited-war capacity rather than spend more and more in what I believe is a redundant capacity to kill every Russian with nuclear weapons.

JOSEPH K. TAUSSIG, JR.
Annapolis, Md.

Typo Catch

Gentlemen: A typographical error appears in the text (*page 247*) of "Highlights of the Year" in your September issue. Beginning with the October 22 item, it should read:

"October 22, 1960—An Atlas steered by a jam-proof inertial guidance mechanism was successfully fired 7,000 niles downrange from Cape Canaveral to a planned target area 200 miles off the coast of South Africa.

"October 24, 1960—A Titan was fired 6,100 miles downrange from Cape Canaveral, just 225 miles short of its planned initial operational range of 6,325 miles. In this longest Titan flight, a data cassette was ejected from the nose cone after reentry and recovered in the South Atlantic about ninety-seven minutes after launching."

I thought you might wish to publish the correction so that your readers who care may keep their records accurate.

MURRAY GREEN
Washington, D. C.

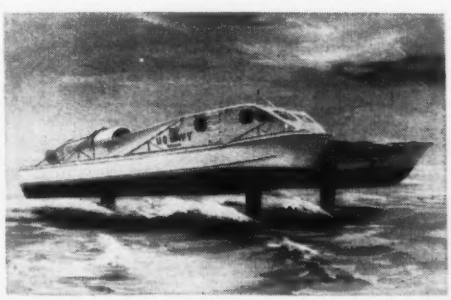
The Gentile-Godfrey Team

Gentlemen: As a researcher into the history of the Eighth Air Force during World War II and one who has a great general interest in the USAF, I would like to thank you for the "Guide to Air Force Bases" on page 213 of

(Continued on page 13)

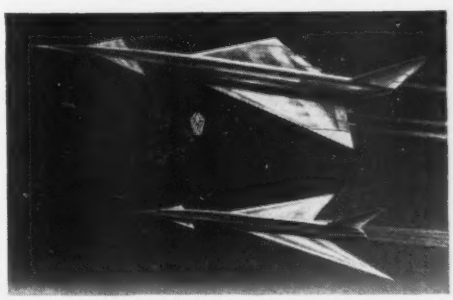
AERIAL MISSILE LAUNCHER. Photo shows Boeing B-52 missile bomber making in-flight launch of Hound Dog missile, which flies at supersonic speed toward target far ahead. In addition to missiles, versatile B-52s can carry regular bomb-bay load of gravity bombs. New B-52H, with turbofan engines and sophisticated electronics, is tailored for wide variety of Strategic Air Command mission requirements. Later, B-52H will carry hypersonic Skybolt ballistic missiles, a 1000-mile weapon under development.

Capability has many faces at Boeing



JET HYDROFOIL. Drawing shows jet-powered twin-hull test hydrofoil Boeing is designing and building for U.S. Navy. Hydrofoil will "fly" on under-water wings at 115 mph.

TWIN-TURBINE helicopter, Boeing-Vertol 107, seats 25 and will enter service soon with New York Airways. 107s have been ordered for service in Japan, Canada and Sweden. Military version is being built for U.S. Marine Corps.



SUPERSONIC JETLINERS. Boeing continues to invest substantial sums in supersonic jet transport research. Drawing shows two Boeing designs being studied. Supersonic jets would fly two to three times speed of sound, make flight from New York to London in under three hours.

BOEING

Just like $103 million in the bank

In the past 4½ years, Hughes has put more than 7,000 cost improvements into practice—saving $103 million in defense and space dollars. Prudent management *avoided* these expenditures.

Savings like these in money, materials, time and human energy don't just happen. At Hughes, cost improvement is a corporate way of life. From top to bottom, in all plants and departments, employees submit ideas and suggestions without thought to personal gain. A comprehensive, fully organized program encourages these ideas, evaluates them and makes them work.

Typical ways in which cost improvements were applied: Machining time on a wave guide was cut from 3½ hours to 32 minutes each—saving $41,201. Application of a Preferred Parts Program simplified specifications and rationalized tolerances and performance standards—result, $40,000 saved the first two months. One radar reflector dish was redesigned to fit two different units—saving $117,000.

Each improvement results in lower contract costs. Some of the major defense programs that benefit include the Polaris, Titan, Falcon and Mauler missiles, new 3-D radar-computer systems now in service on Navy ships and automatic armament controls for Air Force interceptors.

And new Hughes space projects—the Surveyor moon landing vehicle, the Syncom communications satellite, the ion engine for long space journeys—all will deliver full value for every dollar.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

your September '61 issue. This was excellent and it certainly answered some questions which have plagued me over the years.

With my great interest in the "old" Eighth Air Force, I was glad to see such names as Castle, England, Gentile, and Schilling designating the great bases of the Air Force, and to know that these will serve as an inspiration to the young airmen who are stationed at them. . . .

The main purpose of this letter is to put forward a suggestion regarding a change of name for one of the above mentioned bases.

To anyone who has any knowledge of World War II aviation, the name Godfrey will immediately come to mind as one-half of the Gentile-Godfrey team of the 4th Fighter Group in ETO. Between them they destroyed sixty-six Nazi airplanes and most of them were knocked down while working together, impressing the need for teamwork on all Allied flyers. Now both of these great men are dead—Gentile in the line of duty and the active Godfrey from an incurable disease in June 1958.

The Air Force has the Davis-Monthan AFB and the Wright-Patterson AFB, so how about the Gentile-Godfrey AF Station? Please put these names together again and let them symbolize the need for teamwork to preserve peace.

HARRY HOLMES
Manchester, England

Membership Drive

Gentlemen: The Fighter Aces Association held their first memorial luncheon during the Air Force Association Convention this year in Philadelphia. Jim Brooks, the Association's president, was reelected for another year, along with Col. Jack Bradley, vice president, and Cmdr. Gene Valencia, vice president for promotion and public relations. Col. Billy Hovde was elected to the executive committee as vice president, and Col. Ralph G. Watson, retired, was elected secretary and treasurer.

The Association's next fiscal year has been dedicated as a membership drive year. To qualify, one must have destroyed five enemy aircraft in aerial combat while flying a fighter-type aircraft. Potential members should direct their interest to:

FIGHTER ACES ASSOCIATION
P.O. Box 565
Ben Franklin Station
Washington 4, D. C.

Outstanding Airman Program

Gentlemen: The Air Force is indebted to the Air Force Association in many ways and for many, many things. . . . I know of no program or activity, within or outside of the active service, which has done so much toward recognition of the Air Force enlisted man. Speaking as one who has been accorded a measure of this elusive property I thank you for keeping the program "on the books," and I urge that your efforts be continued in that direction in the future. . . .

I have spoken with many of my fellow airmen about the Outstanding Airman program and its purposes. Needless to say, almost every man is a candidate for selection at some future date. When men are fighting for these positions, the Air Force and the nation are the winners! . . .

MSGT. KING K. FRAZIER
AFROTC Det. 645
Ohio State University
Columbus, Ohio

Gentlemen: . . . Witnessing the sincere dedication of Air Force Association members to the promotion of aerospace power and realizing how much the Association has done to enhance the careers of active-duty Air Force personnel made us more fully aware of the tremendous honor bestowed on us and of the great need for a true sense of humility and a greater dedication on the part of ourselves and all other Air Force families. It is with sincere gratitude that I thank you for a most enlightening and unforgettable experience.

MSGT. LEWIS J. JONES
SAC Airman of the Year
Vandenberg AFB, Calif.

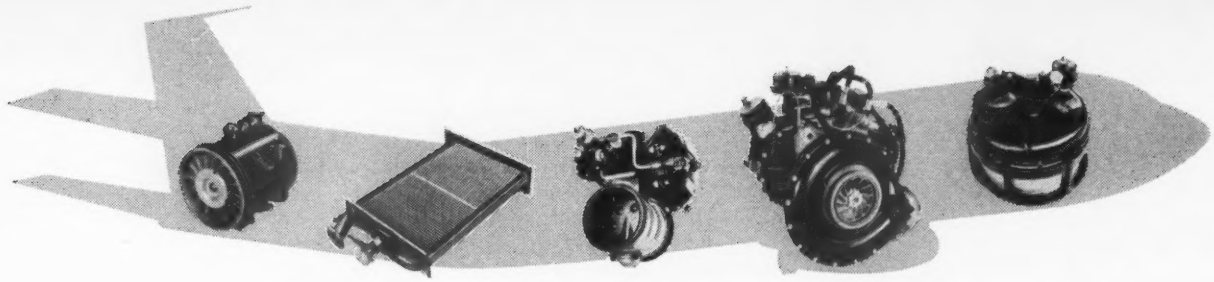
Gentlemen: . . . I have no doubt that this experience will be the highlight of my military career and am most grateful for the part you and your organization played in making it a reality.

Please be assured that this has been a most memorable experience . . . and that there was nothing left to be desired in any aspect of the Outstanding Airman program.

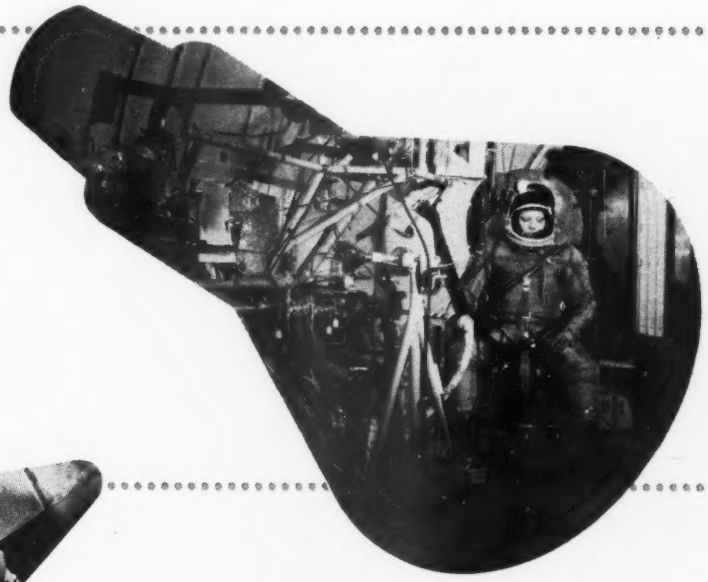
Might I suggest that the AFA consider the possibility of recruiting all selected Outstanding Airmen into your organization. I can see many advantages to the AFA in setting up a more or less exclusive airman group such as this within your organization. I am already a member of the AFA, but to be a member of such a group within your organization would be a source of special pride to me and I'm sure to many of the other airmen in this position.

CMSGT. PAUL C. JACKSON
Travis AFB, Calif.

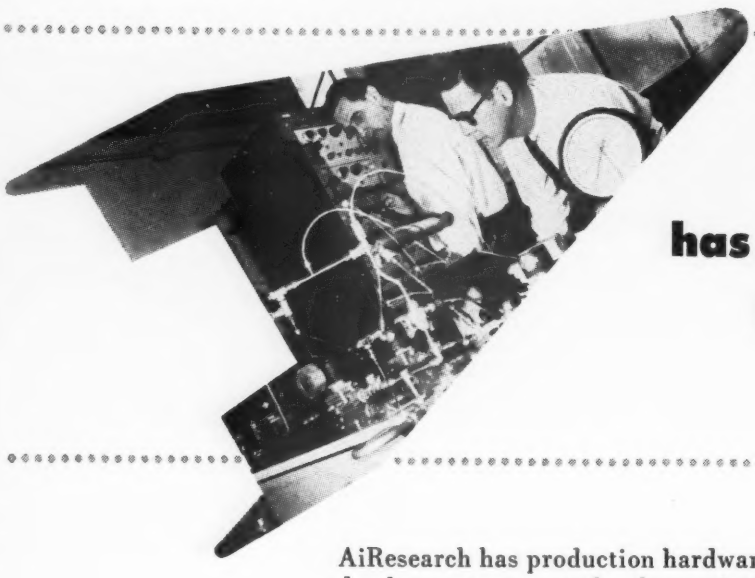
Electronics is our business. Imaginative pioneering in advanced electronics by more than 5,000 Hughes engineers and scientists is speeding man's progress in a host of new ways—with Videosonic* systems that teach new skills in a hurry, with ultra-small micro-electronics for space applications, with computers that can do years of work in hours. Such creative efforts have helped build Hughes into one of the world's most important producers of electronic systems and products. **Trademark Hughes Aircraft Co.*



Only AiResearch has 2 million components in aircraft environmental systems*



Only AiResearch has life support systems for America's astronauts



Only AiResearch has environmental systems <u>now</u> for tomorrow's spacecraft

AiResearch has production hardware experience or has reached advanced stages in development contracts for these principal areas of a space environmental system: space radiators, glycol loops, supercritical cryogenic storage, atmospheric controls, fans, compressors and pumps.

The company's proven ability to produce all the components and integrate them into a complete environmental system reduces the problems of interface and assures the highest degree of optimization.

A new laboratory is now being added to present facilities specifically designed to test environmental control systems for advanced space missions.

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What's New With ★ RED AIRPOWER

Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor document the information beyond assurance that the sources are trustworthy.

The Russians now claim that their standard ground-to-air missile (*see below*) was used to bring that American U-2 down on May 1, 1960. This rocket was first shown publicly in Moscow more than four years ago. Its sustainer section is slightly longer and a few inches larger in diameter than our Nike-Ajax sustainer. The Soviet booster, however, is much shorter, measuring about 5½ feet compared to 14½ feet for the Nike booster.

The Russian missile would have to outclass the Nike-Ajax by a substantial margin if it disabled the U-2 at its cruise altitude. US sources give the Ajax a maximum altitude of around 63,000 feet. Unclassified meteorological data gathered by the U-2 reveals that it has measured weather conditions at 75,000 feet for continuous periods of more than eight hours. The visible aerodynamic characteristics of the airplane indicate that its maximum cruise altitude should be more than 10,000 feet higher.

Therefore, if this Soviet missile was used against a normally cruising U-2, it would have needed performance somewhere between that of the Nike-Ajax, which became operational in 1953, and its newer kinsman, the Nike-Hercules, which is effective to altitudes of 150,000 feet and more.

Even though its booster is small, this Soviet missile could have the necessary performance, if its sustainer rocket uses solid propellants. The Nike-Ajax sustainer uses liquid fuel; if a solid rocket were substituted, almost twice as much propulsive energy could be carried without increasing the sustainer's dimensions. The Nike-Hercules, which is not appreciably bigger than the Ajax, capitalizes on the high density of solid propellants in achieving its high performance. It uses solid rockets in both its booster and sustainer sections.

All evidence indicates that the Russian ground-to-air missile also has solid rockets throughout its system. A number of very clear photographs of the weapon as it has been paraded in Red Square substantiate this assumption.

Several design details of the missile have been disclosed in the Moscow parades and in recent newspaper photos accompanying articles allegedly describing the bagging of the U-2.

An important one illustrating Soviet design simplicity is the fact that the trailer used to transport the missile also doubles as its launcher. Apparently this is true even in permanent installations where the battery positions are made of concrete. The elevating arm on the trailer is pneumatically powered from a tank on the front of the trailer. This tank can be charged by compressors in the transport truck or in the permanent installation.

A radar command-guidance system, similar to that in the Nike series, directs the missile to its target. Four small receiving antennas are located near its nose.

During the boost phase, missile control is maintained by large flaps on the trailing edge of the booster fins. After the booster is dropped and the missile is flying at high speed, control is shifted to the four small fins located just behind the four main lifting surfaces.

Aerodynamically, this weapon is a good example of the missile state of the art in the early 1950s. It uses the well-regarded biconvex airfoil on its lifting and control surfaces. The nose has an ogive shape strongly favored by many Western manufacturers. The design speed is Mach 2.5 or a little better. Judging from external appearances, quality control on the missile is of a high order.

As usual, of course, the Russians in this instance leave many questions unanswered. For one thing, assuming they did use this standard missile to blast the U-2 on May 1, 1960, why had they not used it earlier to prevent the many previous U-2 flights?

—Sovfoto

The standard Soviet antiaircraft missile has been shown in Red Square military parades for more than four years.

Two new Soviet entries in the turbine helicopter field have been unveiled in Moscow. Both are single-rotor machines designed by Mikhail Mil. The smaller one, designated the V-2, carries up to eight passengers and apparently will replace the four-place MI-1 when it enters Aeroflot service. The larger helicopter will seat up to twenty-six passengers. It is called the V-8. If all goes well, it should replace the MI-4, which is now used on the vast majority of Russia's civil helicopter routes.

• • •

Bit by bit, the Russians are revealing the history of their aviation industry. It is now reported that the MI-1 was placed in production in 1951 after it had won a flight test competition against the YAK-100, a previously unreported Soviet helicopter. Both the YAK-100 and the MI-1 used the 575-hp, AI-26V piston engine, carried three passengers in addition to the pilot, and grossed out at around 5,000 pounds. When the YAK-100 lost the flight competition, it was not carried past the prototype stage.

• • •

Soviet sources claim that successful tests have been run on a new type of ground-effect machine. The pressure of the air cushion supporting the vehicle is around ten pounds per square foot, which is five to ten times higher than the pressures previously used by both US and Russian designers. The Russians credit the high-pressure air cushion with solving the stability problems which have plagued other ground-effect machines.—END

AIRPOWER in the news

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

It's Your Move

WASHINGTON, D. C.

One of the local newspapers has printed a cartoon in which President Kennedy is depicted playing a game of chess with Premier Khrushchev. The Russian looks smug. The President looks grim. There is a kibitzer, clearly drawn to represent world opinion. Says the kibitzer to Mr. Kennedy: "Why don't you make the first move for a change?"

The Chief Executive is facing a lot of kibitzers these days, and it is a fact that most of them are asking the same question. An important but relatively unpublicized Senate committee report recently said that our enemy is thinking, planning, and acting in terms of a long haul. It further said that our answer to the challenge can't consist of mere responses and that "a policy of simply reacting to the initiatives of Moscow and Peiping can lead only to eventual defeat of freedom."

The report continued:

"We need a forward and affirmative national strategy—a clear and widely shared understanding of where we aim to go in the world, and how we propose to get there.

"The key problem of the President is to create such a strategy and to establish an order of national priorities on its behalf. His task is to map a course of action which puts first things first, which separates the necessary from the merely desirable, and which distinguishes between what must be done today and what can wait until tomorrow."

There is some significance to the fact that this quotation comes from a report of the Subcommittee on National Policy Machinery of the Senate Committee on Government Operations. The chairman of the subcommittee is Henry M. Jackson of Washington, the same Democrat who was chairman of the party during Mr. Kennedy's election campaign last year and the same one who has accused the Administration of "taking an unnecessary risk" by refusing to spend the $780 million that Congress added to the current procurement funds for bombers.

Mr. Jackson's observation about the need for a forward and affirmative strategy is a pretty familiar refrain in Washington these days. Chalmers Roberts of the Washington *Post* says that the problem is not Mr. Kennedy's age, as so many Republicans feared in 1960, but "that he has still to find that sense of direction, to embody it in a grand design, and to use his undoubted eloquence to work for that design and to convince the American people and the rest of the free world that he is headed in the right direction." Mr. Roberts finds the Kennedy trumpet giving forth an uncertain sound, one that does not call a nation to battle.

This may be a little hard to believe, but there is strong evidence that a major cause of the Kennedy Administration's unhappy situation is identical with that well-worn stumbling block of the Eisenhower era—a near obsession with the budget. Indeed, Senator Jackson's subcommittee hung its strong words of advice—the demand for a forward and affirmative national strategy—as a mantle on its study of the Bureau of the Budget. There were hearings held on the budgetary process, and the witnesses included both Charles J. Hitch, Assistant Secretary of Defense and Comptroller, and his experienced predecessor, Wilfred J. McNeil.

The Jackson subcommittee looked with some favor on the changes introduced at the Pentagon by Mr. Hitch and came out in favor of a strong Bureau of the Budget. But there was equal emphasis on the necessity for a strong—or at least definitive—presidential program. The assistant secretary, here in early November, has at hand the fiscal 1963 budget requests of the Army, Navy, and Air Force. These requests were prepared on the basis of "program packages" which had been tentatively approved by Defense Secretary McNamara and given to the services for guidance. There are seven "packages."

For the record, the packages are:

1. **General War Offensive Forces.** This includes large segments of USAF, the B-52 with its air-launched missiles, the B-58s and B-47s, the tankers, the Atlas, Titan, and Minuteman ICBMs, and the shorter-range Thor. There is the Navy's Polaris system, plus all of the communications links that are needed to make these weapons work, together with their support in the field.

2. **General War Defensive Forces.** Here are the interceptor aircraft of both USAF and the Navy, the Army's surface-to-air missiles, and the warning systems that will send them into action.

3. **General Purpose Forces.** The new USAF-Army Strike Command, the Marine Corps, the Navy's combat ships and carrier units all are in this package, designed to fight local and limited wars.

4. **Sealift and Airlift.** The essential parts are USAF's troop carrier wings, the Military Air Transport Service, and Military Sea Transportation Service.

5. **Reserve and National Guard Forces.** These elements are arranged according to service and within the service according to which of the missions they support. They are reviewed twice, the second time as part of the mission package with which they are affiliated.

6. **Research and Development.** Included are all projects not already covered in the program packages. Space projects are in the R&D package, in a separate group.

7. **Service-wide Support.** Mr. Hitch calls this the "all other" package. It covers training, overhead of supply and maintenance systems, medical support, intelligence, and higher headquarters.

This realignment of the Defense Department budget is a management tool. Mr. Hitch says the military departments have done a good job in their struggles for fiscal 1963 and that their budget requests "constitute the most comprehensive body of data on the defense program ever made available to the office of the Secretary of Defense."

The Comptroller is not able to argue, however, that this management tool can, of itself, meet the subcommittee's demand for a forward and affirmative national strategy. It seems pretty clear that the strategy has to be formulated, it has to command public support, and it has to be clear that the strategy stands a fair chance of meeting the menace. This is where Mr. Kennedy's leadership enters the picture.

(Continued on page 21)

Today many heart specialists use X-ray movies made practical by Raytheon's Machlett Laboratories Division

INWARD... OUTWARD

Probing into the human body or outward along our airways, Raytheon electronics guard your well-being and safety.

In the fight against heart disease, doctors have a unique weapon in X-ray motion pictures. Practical X-ray movies and televised X-rays have been made possible by Raytheon developments that reduce exposure to harmful radiation by 90 per cent. The result is earlier and more accurate diagnosis of heart disease.

Across the country, Raytheon radars precisely track flying aircraft to help air traffic controllers keep order along the skyways. With flight speeds increasing and traffic becoming more dense, development of still more powerful radar systems by Raytheon, in cooperation with the Federal Aviation Agency, helps assure continued air safety.

In these and other ways, Raytheon pioneers new electronics frontiers—strengthening our defenses on land, sea and in the air, improving industrial production processes, increasing everyday comforts and extending the scope of man's knowledge.

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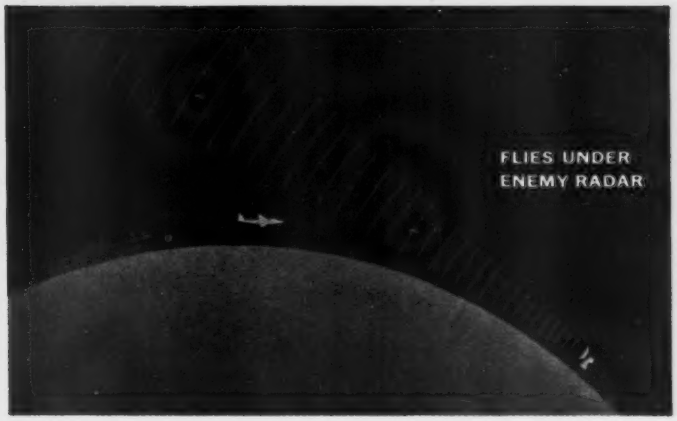

The Grumman Intruder: it skims terrain in dead of night to search its prey... and "kill"

Under cover of night or foul weather . . . in comes the A2F-1 Intruder, penetrating enemy territory undetected.

Its mission: seek out enemy targets in brushfire war. Destroy at will.

Visibility might be zero. Terrain, unfamiliar. Target, moving. Yet the Grumman Intruder and its 2-man crew will navigate faithfully to the target area. They will find their target and destroy it. There will be no error. No miscalculation. For the Intruder will be equipped to "see" through dead of night, to "guarantee" the kill.

Its radar will seek out the target, give the crew continuous data. This highly sophisticated radar will also project a target image on a display in the cockpit, enabling the pilot to evaluate the situation.

Should he kill or pass? If his decision is to kill, at the push of a button his radar will pinpoint the target. Then, a computer will direct the weapons with uncanny accuracy.

The weapons launched could be air-to-ground missiles. Or 500-pound bombs. Or nuclear weapons. Whatever the weapon, however, the A2F-1 Intruder will deliver it with great effectiveness. The result: the U. S. Navy can depend on the Intruder's extended range and heavy-weapon capacity to help wage, and win, a limited war.

The A2F-1 Intruder is illustrative of the many advanced projects now under way at Grumman. Some of these, like the Intruder, are weapons systems. Others, like the Grumman Orbiting Astronomical Observatory, span the scientific spectrum—from space to nuclear research, from hydrofoil boats to revolutionary VTOL aircraft.

In all these important areas, the answers are being unlocked at Grumman.

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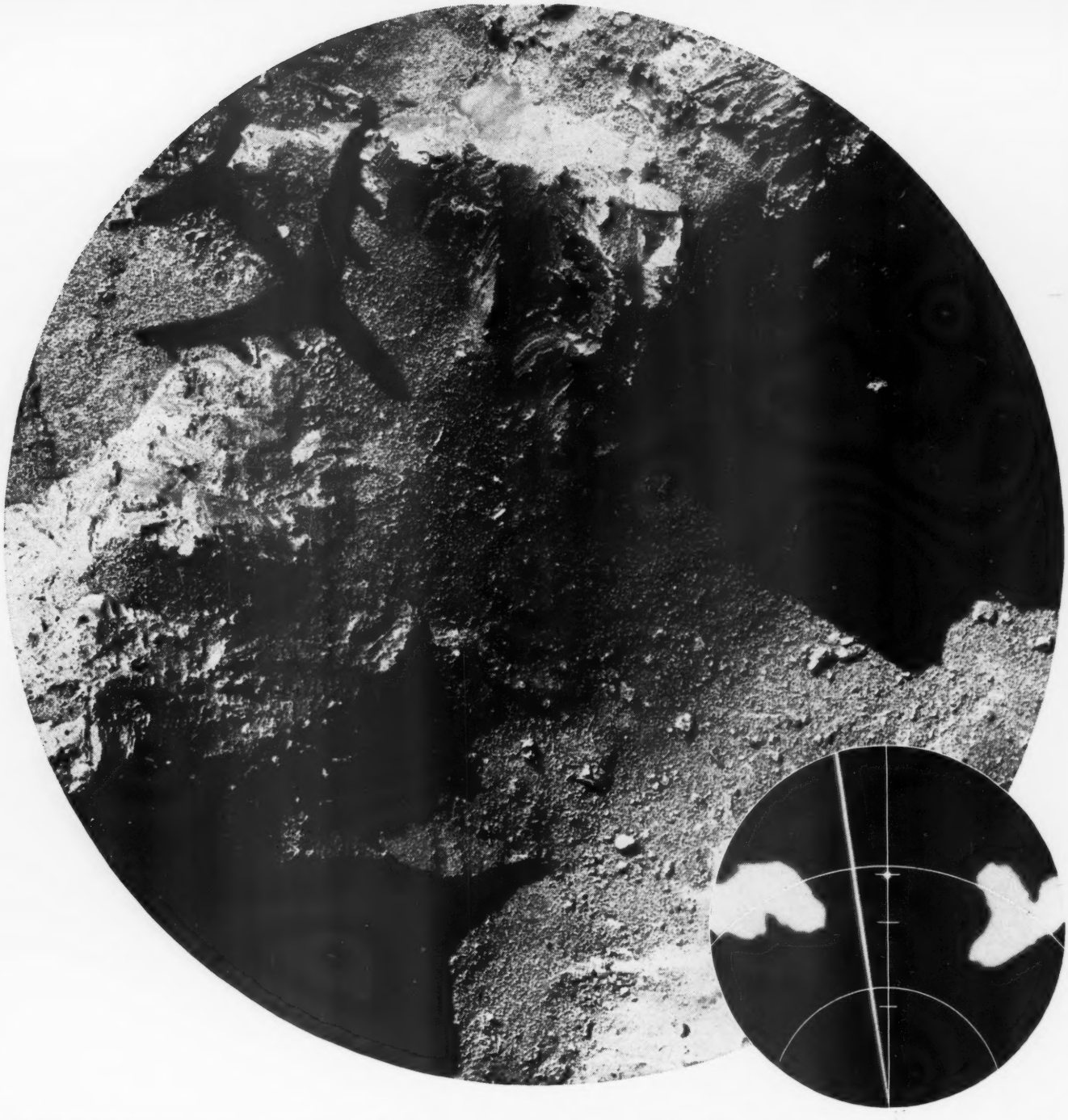

ENGINEERS ARE CHARTING A NEW COURSE AT AC

AC's newest assignment is Systems Integrator for the modified B-52C&D Bombing Navigation System. AC's responsibility includes program and engineering integration, and coordination of associate contractors in the production phase. ■ Other programs at AC include a new, miniaturized inertial guidance system for the TITAN II missile. In addition, AC's Los Angeles Advanced Development Laboratory is currently developing Advanced INertial Guidance Systems. ■ AC is seeking qualified men to work on these important projects. If you have a BS, MS or PhD in Electrical Engineering, Mechanical Engineering or Physics, please contact Mr. G. F. Raasch, Director of Scientific and Professional Employment, Dept. 5753, 7929 South Howell, Milwaukee 1, Wisconsin. An Equal Opportunity Employer. ■ Immediate positions available:

Milwaukee

Radar Systems Engineers • Radar Test Engineers
Radar Reliability Engineers • Design Review Engineers
Contact Engineers • Field Service Engineers

Los Angeles

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Sr. Digital Computer Development Engineers

■ AChiever Inertial Guidance Systems for TITAN II, THOR and MACE—Bombing Navigation Systems for the B-52C&D and B-47—AChieverfone mobile radiotelephones.

AC

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It is where he has a chance to make the first move in that chess game with Nikita Khrushchev.

On the surface, there is almost no indication that the President is concerning himself with strategic problems to any great degree. There is increasing criticism of the trends in this area. To begin with, Hanson Baldwin writes in the New York *Times* that the Secretary of Defense has gone far beyond his traditional role as a policy-maker and is becoming deeply involved in details of management, administration, and operations.

"Today strategy and strategic concepts," he says, "are probably being influenced more by the office of Paul H. Nitze, Assistant Secretary of Defense for International Security Affairs, and by the State Department, than by the Joint Chiefs of Staff. The Joint Chiefs are not normally being bypassed, but they certainly have been downgraded."

It has been pointed out before in these pages that Mr. Kennedy is the Commander in Chief of the armed forces and that the Chiefs of Staff are supposed to be his top military advisers. If Mr. Nitze and the State Department have replaced them they may be responsible for any weaknesses detected by the Jackson subcommittee, Chalmers Roberts, or even a cartoonist drawing pictures of a chess game. And no amount of managerial talent, displayed by Mr. Hitch in his formula for drafting a budget, can turn those weaknesses into strength.

We could, at this point, belabor again the circumstances surrounding the catastrophic incident at the Bay of Pigs, on the coast of Cuba. Of greater interest, however, is the still-persistent thought that the Kremlin remains unconvinced of our determination to meet our obligations in Europe. We reported in September on the clear lag in the credibility of our nuclear deterrent. Margaret Chase Smith, on the floor of the Senate, called this situation to the nation's attention and blamed it, in large degree, on the emphasis we are putting on conventional weapons for conventional warfare.

Since then, there has been a determined effort by the Administration to reverse the trend, dust off the nuclear arsenal, and rattle some rockets right back at Khrushchev. Roswell L. Gilpatric, Deputy Secretary of Defense, has made the strongest statement, declaring we have "a nuclear retaliatory force of such lethal power that an enemy move which brought it into play would be an act of self-destruction on his part. . . . A sneak attack could not effectively disarm us." The President himself has reiterated his determination to fight if it is necessary.

Yet the skepticism seems to prevail. A *Wall Street Journal* correspondent, reporting from London, says that our country has tried unsuccessfully to impose upon our NATO allies a "doctrine of the conventional weapons pause." This is defined as an idea that in the first stages of another war we should rely on nonnuclear armaments and thus provide time for negotiations before H-bombs blister the globe. A British Defense Ministry spokesman is quoted as saying: "The pause idea is an acceptance of Russian salami tactics. You let them slice a little more off, then as long as they haven't used nuclear weapons, you rush to negotiate with them." This may be a strategy that comes out of Mr. Nitze's office and the State Department. It is not one that would appeal to the Joint Chiefs or to the President if he were to form a stern strategic policy with professional military advice.

Brig. Gen. Thomas R. Phillips, a retired Army officer who has taken up a typewriter as a military commentator, has been to Germany recently to look at the wall in Berlin. Having seen it, he now asks: Where were the bulldozers? General Phillips believes one reason Russia does not believe we have the will to resist is that the wall still stands. We had every legal right to knock it down, and he says allied military commanders in Berlin so recommended. He also reports that "the failure to act left the Soviets and the East German regime with the impression that their show of force had been sufficient to cow the West."

If we look at the cartoonist's chess game, the growing call for more leadership from Mr. Kennedy, the improved management techniques being imposed on the Pentagon's budget, the sagging influence of professional soldiers, and the kind of strategy we seem to be following, it adds up to a situation that cannot possibly improve our prestige, which is an item that was widely discussed during the last presidential campaign. There are some blunt persons who, with cause, are calling this the third Eisenhower Administration.

Let's Get It Right

There has been a minor flurry in Washington over the contents of a book entitled *The Nation's Safety and Arms Control*, by Arthur T. Hadley. Copies of this volume, the genesis of which is partly the responsibility of Jerome B. Wiesner, the President's Assistant for Science and Technology, have been sent to all members of Congress by the Federation of American Scientists.

The book contains a number of serious errors. They have been called to the attention of Capitol Hill readers by Rep. Edwin B. Dooley of New York, who has based his case on a refutation supplied by Eugene M. Zuckert, Secretary of the Air Force.

Mr. Dooley's letter makes the point that—contrary to statements in Hadley's book—a Matador missile *cannot* be fired by a single soldier acting on his own responsibility. And that there is *no record* of an incident, as described in the book, of a Bomarc starting to let itself go because of a malfunction. Furthermore, the control system for the Minuteman ICBM includes manual and procedural restraints that make it *impossible* for a squirrel to start a war by chewing through a cable.

Books on the subject of arms control are popular reading these days and properly so. There is, however, a strong predilection on the part of some writers to confuse the issue by *attacking* arms, as if they can be controlled by condemnation. There is more to it than this, which they would learn if they conferred with armament experts instead of disarmament experts.

They Fooled Us Once

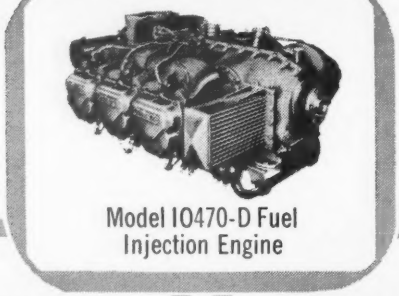
"The Soviet Union prepared to test while we were at the table negotiating with them," President Kennedy told a recent news conference. "If they fooled us once, it's our own fault. If they fool us twice, it's our fault."

The Chief Executive delivered this opinion at a moment in American history when the nation stands on the verge of making what must be a grave decision. He has, in effect, postponed that fatal moment by saying we will prepare for atmospheric tests and carry them out if we feel we have to. Inside of days the United Nations General Assembly passed a resolution, 71 to 20, making it clear that the United States will be condemned if we follow the Soviet precedent.

Mr. Kennedy now is in the position of having denounced the Russian explosions as a political exercise, having little, if any, technological or military significance. Yet, by his own words, if we resume testing it will be for the purpose of ensuring our continued security. By this time, it

(Continued on following page)

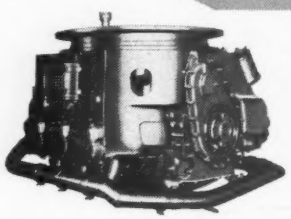
CONTINENTAL
AIRCRAFT ENGINES

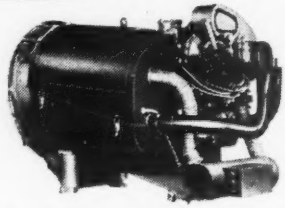


Model FSO526-A Helicopter Engine

Model IO470-D Fuel Injection Engine

Model PE-150 Continental Packette





An exceptional record of dependability has earned these specialized power plants– for fixed wing aircraft, helicopters, and a wide range of ground support equipment– an important role in the overall job of Free World defense

•

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AIRPOWER IN THE NEWS—

is clear, the entire question for us in this still-practicing democracy has been placed on the level of public discussion, and there is nothing Mr. Kennedy can do to recall the issue. When he finally makes his decision, it is equally clear, he will need public support. There have been other momentous decisions in the US atomic program since the day that Albert Einstein wrote his famous letter to Franklin Roosevelt, but never has there been one in which the American public had the opportunity, the obligation, and the strong desire to participate.

Our quandary, and we all are in it just as deeply as John F. Kennedy, can be eased by only two steps:

1. We must lift, to a great degree, the strong veil of secrecy that surrounds our activity in the area of nuclear weapons.

2. We must listen, also to a great degree, to the active military men in all branches of the armed forces who will have to fight a war if it comes. That includes limited and unlimited wars.

Without these two steps the President never can obtain anything like solid public support for his decision.

On the subject of secrecy, Thomas E. Murray, for seven years a member of the Atomic Energy Commission, has written that "a government practice of maintaining not only technical secrecy but policy secrecy as well has resulted in hiding the facts on crucial nuclear issues from the American people and keeping our nuclear armament program completely insulated from the influence of an informed and responsible public opinion."

Early in the atomic era there were sound reasons for secrecy, but it was not long before those reasons began to be sucked up in a mushroom cloud of technological progress. "We must realize," Mr. Murray said, "that no technically feasible achievement can be long denied either to us or to [Russia]."

The reference here is to the scientific fact that progress is made in laboratories all over the world and that the men who bring this progress about are following parallel lines of research and development. Their results will be the same and the time cycle not very different from that of various soap manufacturers cluttering up the supermarket counters with their competitive products, all now enriched with the same new secret ingredient.

In view of this, why are the American people, as well as allies and potential enemies, kept in the dark about

facts that will help form sensible programs in the interest of national security and world peace? The answer, many suspect, is what Mr. Murray has called our fate of being caught in the grip of a "technological runaway." He feels that "technology itself rather than strategic or moral reason has determined the shape of our weapons program and our defense policy." In part, this is the outcome of another early decision, the one that divorced military men as far as possible from the determination of policy on the use of atomic weapons. In the Korean War, for example, General MacArthur had no nuclear arsenal at his disposal.

After World War II a substantial segment of the scientific community, rebelling to some degree against the fact that progress in atomic energy had lent itself first to reactions at Hiroshima and Nagasaki, encouraged the trend to secrecy. Their philosophy, it seems clear, was that technology now was dangerous, particularly when its products were put in the hands of the military or even—in this country—its democratic and civilian bosses. And our civilian policy-makers went along.

This leads to the second area in which a change is needed if this country—and President Kennedy—are to meet the nuclear test dilemma head-on. This is the necessity for more military participation in the public discussion. It is related to the entire matter of the open discussion of matters concerning military strategy and the right of men in uniform to take part in these exchanges.

Perhaps there will be a day when the book-review editors discover the fact that until recently there was almost no native American literature on the subject of strategy except for the work of Billy Mitchell and Admiral Mahan. Possibly Alexander de Seversky can be included. But the bookshelves are filling up. The bindings carry names like Bethe, Brodie, Kissinger, Pauling, Strausz-Hupé, Knorr, Hitch, Snyder, Hadley, Garthoff, and Morgenstern. There are others, some in scholarly works, some in books which are compilations of essays by commentators of the same mind. Meanwhile, professional journals are handicapped in their presentation of military discussion by the nation's best military experts. The handicap is imposed by civilians who hold that matters of strategy involve policy and that policy is the exclusive concern of the political administration.

For application to today's problem—a decision on nuclear testing that must be made by the President with the support of the people—there should be more books from military authors who have not held their pens dry until they have resigned in some state of dudgeon. USAF's Gen. Thomas Power, Commander in Chief of SAC, has at least one volume in his file that should be in every well-equipped library. Its publication is forbidden.

There are, from time to time, some expressions by military men that at least recognize the problem. One of these was a recent speech by Gen. Frederic H. Smith, Jr., USAF Vice Chief of Staff. Public understanding of defense issues, he said, is imperative. And one of the things the General feels is widely misunderstood is the role of nuclear weapons, particularly their use in battle.

"This weapon has been buried in secrecy," General Smith said. "Because of the highly classified facts surrounding its development and the principles for employing it, there is a very small group of persons who have any information about it. Because of this fact, it has been shrouded in mystery and subjected to widespread rumor and erroneous information.

"It is envisioned as a horror weapon whose use would bring certain destruction to the human race. It is thought of as a weapon to be used only when negotiation has failed, when actually it is a highly flexible, efficient modern weapon. It is a weapon whose capacities could be used to force an enemy to conclude hostilities before they reach higher intensities."

This statement, clearly, says that nuclear weapons do not contribute to "escalation" and, in fact, can prevent it when they are used properly. General Smith says nuclear weapons cannot be used haphazardly and that there must be clear restrictions on targets, yields, and the character of bursts. He not only admits, but declares, that "the objectives of the limited war should be explicitly defined by higher authority and should include a restriction against strikes outside a delimited zone of hostilities."

The Vice Chief of Staff feels that there are limited-war situations in which nuclear weapons can be used more effectively than conventional weapons. These involve what he calls "situational-control" targets. An example is the objective that is in a dense forest, a hilly and mountainous area. This kind of environment was met during World War II in places like New Guinea, Indonesia, the Solomons, and the Philippines. Napalm was used in that war.

In one scrap 14,000 enemy troops were holed up in elaborate cave positions over an area of a square mile. Five fighter groups flew 646 sorties to deliver 200,000 gallons of napalm before ground forces could command the situation. One nominal-yield nuclear weapon, delivered by one tactical fighter, would have done the same job. No noncombatants would have been hurt; there would have been no lingering radiation. There are many other examples.

Broad public understanding of these matters, General Smith says, is essential if we are to have continued security. Continued development of improved nuclear weapons can and will broaden their practical application in strategic and tactical warfare. What the Russians accomplished along this line when they fooled us once, nobody knows. If they fool us twice it may be because the President, backed by an ill-informed American public, made the wrong decision.
—END

THE MILITARY AND THE UNWELCOME EMBRACE

"The single greatest domestic curse of our times is precisely this—irresponsibility. It is this which we need to fear more than subversion and treason.

"For irresponsibility runs amok with a vague and terrible strength, terrible because it cannot be identified and mastered. It is not manifested always in such shabby Bircher talk as suggesting that Dwight Eisenhower didn't really wish to defeat communism. It is sometimes manifested in guilt-by-association techniques from the Left as well as the Right.

"There is, for illustration, the notion spread by some in recent months that the whole of the military establishment, the whole of the military mind, ought to be held suspect because some officers held or spread Right-wing political views.

"Whoever irresponsibly contributes, in such an hour as this, to an unfair and generalized attack on the military services is completing a dreadful act of discredit which the New Rightism itself began by putting its unwelcome embrace upon these services."

—WILLIAM S. WHITE, in *Harper's*

News,
Views
& Comments

AEROSPACE WORLD

By Frederic M. Philips
ASSOCIATE EDITOR, AIR FORCE MAGAZINE

The Soviet Union this month callously applied its nuclear weaponry against the will and spirit of the free world. By early November, the Reds had set off thirty-one atmospheric nuclear test blasts in the series begun on September 1. Two of these reached massive proportions. The October 30 explosion, at 12,000 feet over the Soviet Arctic, totaled at least fifty megatons, or a force equivalent to 50,000,000 tons of TNT. The October 23 shot, also in the Arctic, weighed in at twenty-five megs, initially estimated at up to twice that. Protests against the testing came to Moscow from a score of nations, the UN General Assembly, and the US. These went unheeded, as Russia pursued its twin goals of frightening the world and developing new weaponry.

Both goals were achieved, at least in part. Uncommitted nations were pressing hard for another test "moratorium," ignoring the obvious fact that the Russians, having accomplished their objective, would be happy to bow out of a race which the US had not yet entered.

The US on October 30 held its fourth under-pressure-from-Russia underground nuclear test in Nevada. First was in mid-September. Underground tests do not set radioactive products at large.

But President Kennedy opened the door to US resumption of atmospheric tests, if needed, when he said on November 2: "Should such tests be deemed necessary to maintain our responsibilities for free-world security, in the light of our evaluation of the Soviet tests, they will be undertaken only to the degree that the orderly and essential scientific development of new weapons has reached a point where effective progress is not possible without such tests—and only within limits that restrict the fallout from such tests to an absolute minimum. In the meantime, as a matter of prudence, we shall make necessary preparations . . . so as to be ready in case it becomes necessary to conduct them."

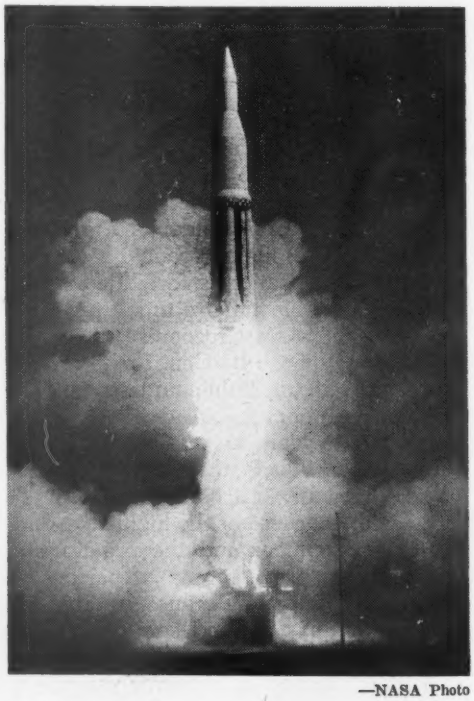
☆

Major hardware news of the month:

★ The **X-15,** on November 9, roared beyond its own speed limit, going a record 4,070 mph, with Air Force Maj. Robert M. White at the controls. En route home from 100,000 feet, the outer panel of the X-15's right wind-

By early in November, the Russians had conducted thirty-one atmosphere-contaminating nuclear tests in their new series. Right, cartoonist Herblock views Soviet boss Khrushchev at work.

"Autumn Haze"—Herblock in The Washington Post. Reprinted with permission.



—NASA Photo

World's mightiest rocket booster, Saturn, rises from Cape Canaveral pad in maiden flight October 27, a spatial day for US.

Left, USAF Lt. Col. Francis M. Carney at controls of the Kaman H-43B Huskie helicopter in which he set four records during the past month.

Right, nine Atlas ICBMs go into SAC service at Forbes AFB, Kan., under 548th Strategic Missile Squadron. Left to right in turnover ceremony are Maj. Gen. T. P. Gerrity, commander, Ballistic Systems Division; Lt. Gen. John Ryan, SAC Second AF commander; Col. Gerald Clugston, commander of 548th.

—Wide World Photos

shield spread into a maze of cracks, and White, after a perfect landing, said modifications might be necessary to prevent recurrence. The 4,070-mark at fuel burnout was seventy miles more than designed maximum speed. The rocketcraft's skin temperatures reached a temperature of 1,100° Fahrenheit during the flight—a record that may stand for years. With maximum speed reached, next X-15 mission was to reach designed top altitude of some 250,000 feet. After that, further flights over the next two years, to try to reach even higher altitudes for research data on reentry stresses. October 17 had seen a flight by NASA's Joe Walker to 3,920 mph, topping White's 3,647-mph mark set six days earlier. Walker's October 17 flight was within shouting distance of the 4,000-mph designed speed capability, but he'd been instructed to use brakes.

★ NASA successfully launched the world's mightiest rocket booster on a maiden flight October 27. Up from Cape Canaveral went the 1.3-million-pound-thrust **Saturn** to an altitude of ninety-five miles. Then, as programed, it fell into the Atlantic Ocean 200 miles downrange. Saturn, which still has a long developmental road to travel before it is useful operationally, was believed to be the largest piece of hardware ever to leave the ground anywhere in the world. It stood 162 feet high and weighed in at 925,000 pounds. By comparison, it was noted, the Statue of Liberty is 151 feet tall and weighs 457,000 pounds. The NASA rocket's primary missions in the future will include placing three-man Apollo spaceships in orbit—first around the earth and then around the moon. The earth orbit was hopefully set for 1964, the moon circle for 1966. By that date, Saturn thrust should be in the neighborhood of three to four million pounds. Only the eight-engine first stage of the three-stage rocket was fired on October 27. Two dummy upper stages were loaded with water ballast for the test. NASA plans ten research-and-development shots of this sort by 1964. Next test was slated for spring of 1962.

★ Four new records were turned in by an Air Force pilot in a Kaman **H-43B Huskie** helicopter. The Huskie already held a world payload-to-altitude mark set back in May. Air Training Command's Lt. Col. Francis M. Carney flew his chopper 32,279 feet, a weight-class record, on October 18 at the manufacturer's Bloomfield, Conn., plant. Previous record in the 3,858-to-6,614-pound helicopter class was established by an H-43B in December of 1959. Colonel Carney hit the record trail again on October 24. This time he captured three time-to-climb records in a single H-43B flight: (1) To 3,000 meters (9,842 feet) in two minutes 44.5 seconds. Previous record here was held by an Army Bell HU-1 with a time of three minutes 29.1 seconds on July 19, 1960. (2) To 6,000 meters (19,684 feet) in six minutes 42.3 seconds. The HU-1 attained this height in eight minutes 7.1 seconds in the July 1960 hop. And (3) to 9,000 meters (29,526 feet) in fourteen minutes 11.5 seconds. A French Alouette chopper was previous top performer here with a time of seventeen minutes 43.9 seconds on June 13, 1958. The Huskie already had set a world record for helicopters carrying 1,000 kilograms (2,205.5 pounds) on May 25. On that occasion, Tactical Air Command Capt. Walter C. McMeen attained 25,814 feet in a flight also over the Connecticut test area. The Huskie is in service at USAF bases throughout the country.

★ USAF put a **Midas** developmental missile-detection satellite into orbit on October 21 from Point Arguello, Calif. An Atlas-Agena vehicle sent it on its way. Along on a piggyback ride was a seventy-five-pound container bearing 350,000,000 tiny copper wires. This was the second successful Midas shot in four attempts. The US aims to develop a thirty-minute warning period of enemy surprise rocket attack. The copper wires fired into space in Project West Ford were each seven-tenths of an inch long and one-third as thick as a human hair. Plans called for them to be ejected from their container to form a radio-reflecting copper cloud. The hope is that within sixty days they would spread into a belt around the earth at a distance of some 2,100 miles. Theoretically, the little copper reflectors called dipoles could be used to bounce radio waves halfway around the world—a step in the direction of a jam-proof military communications system. Scientists also hoped that the dipoles could in time play an important role in civilian communications. USAF announced within days after the launch, however, that the outcome of this communications experiment appeared in doubt.

★ **Midas IV** itself was a soaring success. Four days after launch, on October 25, it was able to detect a Titan ICBM roaring up from Cape

(Continued on following page)

Canaveral, Fla., on an overwater flight. The Titan blastoff was timed to coincide with the Midas' passage overhead. Ninety seconds after liftoff, the Air Force announced, infrared sensing devices in the detection satellite picked up the ICBM's exhaust trail. The information was relayed to a ground station. The Air Force said this was a "good test" of the Midas. So far as the Titan was concerned, the shot marked a ninth straight successful launch. It landed some 6,100 miles downrange.

★ **Discoverers** batted one for two. The thirty-second in the Air Force satellite series went up on October 13 with a boost from a Thor rocket. This was the Thor's one-hundredth perfect firing.

A C-130 cargo plane piloted by Capt. Warren Schensted caught the Discoverer's capsule over the Pacific the day after launch. Captain Schensted's plane also snagged Discoverer XXX's capsule in September—and he spotted the capsule of Discoverer XXV and guided skindivers to it in June. This was the sixth aerial recovery of a Discoverer capsule. Three have been retrieved from the sea. Another Discoverer shot failed on October 23. Discoverer XXXIII roared aloft from Vandenberg AFB, Calif., but its second-stage Agena booster apparently shut off and prevented the satellite from reaching orbit. Twenty-one Discoverers have attained orbit in the series.

★ The Air Force ordered 144 more **Northrop T-38A Talon** supersonic jet trainers at the end of October. The new contract brought the total order of these aircraft to 357. All were to be delivered by the end of 1963. The Talon, first supersonic trainer designed specifically for pilot training, is now in service with the Air Training Command as basic pilot trainer in the Air Force's all-jet flight-instruction program.

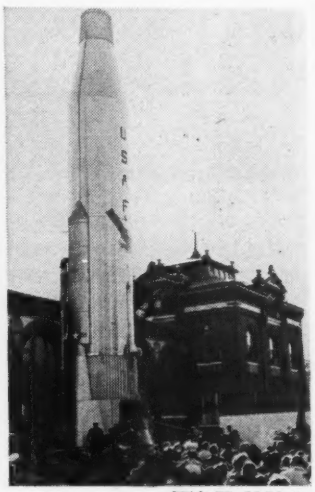
☆

One US response to heightened world tensions—one long overdue—has been a stepped-up civil defense program. The Administration some months ago assigned responsibilities in this field to the Department of Defense and established the post of Assistant Secretary of Defense for Civil Defense. Steuart L. Pittman, Washington attorney named to this position, closely examined the nation's civil defense problem in a recent address on the West Coast. He made these points:

- Step one of the federal government effort, now under way, is to provide "information understandable to all on the nature of nuclear explosions and fallout and on protective measures available to people in different situations."
- Step two is "an intensive effort to spread through the country the technical know-how which is the cornerstone of any major nationwide shelter building." Plans call for increasing emphasis on "community shelters serving dual-purpose community objectives."
- Pentagon attention in the past few months has centered on "a quick start in the new program to bring into use shelter space for over fifty million people in existing buildings, subways, tunnels, or caves."
- A central aim at present is to "spread the technology of antiradiation construction through the Army Corps of Engineers, Navy Yards and Docks, and about 2,000 civilian architects and engineers."
- "Data on all major structures in this country will be amassed on IBM cards for use in analyzing radiation protection capacity and for possible use in later modification of these buildings to increase sheltering capacity. Making, stocking, and equipping of these shelter spaces will take place during most of 1962."
- Evacuation of population centers has been a cornerstone of civil defense thinking in recent years, "but in general we all know that short warning time in the misslie age and the long reach of fallout requires reorientation of many local plans around the movement of people into nearby shelters."
- Accent in a national civil defense buildup must be on a local and personal level with federal support: "America being what it is, civil defense must be community oriented and it must be personal initiative oriented."

—Wide World Photos

Rocket-powered escape capsule shoots upward after ejection through roof of a B-58 Hustler bomber at Edwards AFB, Calif., in early October. Highly advanced capsule for the world's fastest bombing plane carried dummy in tests conducted from fast-taxiing Convair plane.



—Wide World Photos

Commander Shepard's Mercury capsule went to the Smithsonian, October 23rd.

☆

Is the "military" currently being "muzzled"?

Reported one of the Washington newspapers on October 13:

"A controversial issue of the *Air University Quarterly Review* made its appearance today six months late—and minus four articles by generals.

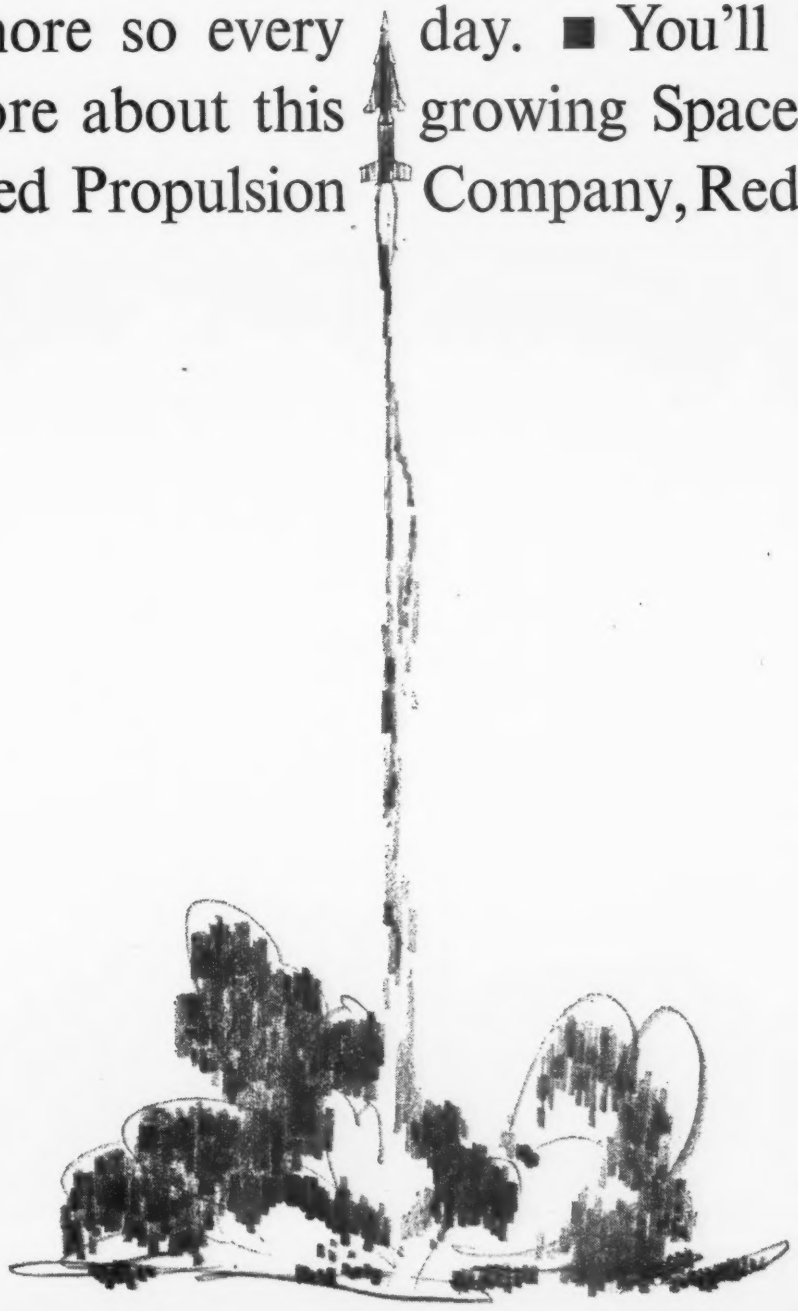
"All four articles had been cleared by the Eisenhower Administration. Two were rejected by Defense Department security review officers under Kennedy Administration rules, and two are still in defense clearance process.

(Continued on page 29)

■ Yesterday, the Grand Central Rocket Company was a partially-owned subsidiary of Lockheed. Now GCR is wholly owned, and it has a new name:

LOCKHEED PROPULSION COMPANY

■ The scientists of this new Lockheed company are among the most talented in the free world. Their facilities are modern and advanced – and getting more so every day. ■ You'll be hearing much more about this growing Space Age force. ■ Lockheed Propulsion Company, Redlands, Calif.



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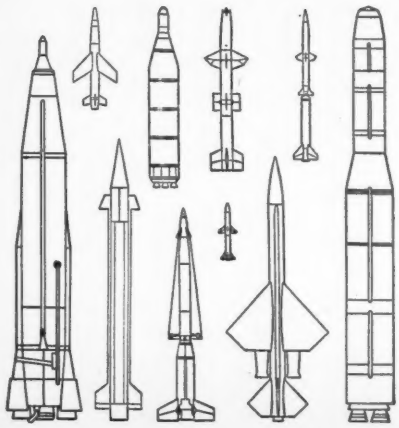

GSE

—US Air Force photo

Winners of Aerospace Education Foundation 1961 awards with AFA Board Chairman Thos. F. Stack. From left, John N. Cole, Lt. Frank A. Olson, Mr. Stack, Charles R. Geesner, Dr. C. R. Barnes, Dr. Hans L. Oestreicher. Recipients were all Air Force scientists. The foundation is affiliate of AFA.

World War I Sopwith Snipe airplane is new addition to the Air Force Museum at Wright-Patterson AFB, Ohio. Plane was in action late in war, performed well against Germans. At museum, Snipe joins continually growing display of planes that have made military history for the past fifty years.

"The latter two, by Gen. Thomas S. Power, commander of the Strategic Air Command, and by Brig. Gen. Robert C. Richardson, former chief of the Air Force Long-Range Objectives Group, may yet be used in a forthcoming issue if they finally win approval.

"General Power wrote on 'The Price of Survival,' and General Richardson on the 'Air Force of the Future.'

"Rejected altogether for security reasons were an article on strategic reconnaissance by Lt. Gen. William H. (Butch) Blanchard, former SAC operations director recently appointed Inspector General at the Pentagon, and one on the Soviet challenge by Brig. Gen. Robert N. Smith, SAC director of intelligence.

"The delayed issue, designated the winter and spring 1960-61 volume, was originally planned for publication last April 30.

"After the publication date had been held open for months, awaiting hoped-for clearance of all articles, the issue was 'closed' last July 10.

"The summer 1961 issue is now ready for publication, and the autumn issue has about been completed. Thus the Power and Richardson articles, if cleared, probably cannot appear until the winter issue which—under the delayed schedule—will not be published until next spring or early summer.

"The Air Force said in reply to queries that all four articles were approved under the former Administration between June 1960, and 'roughly January 18, 1961.'

"It said the manuscripts were sent for a second clearance by mutual agreement between the Air Force and the Office of the Secretary of Defense.

"The issue contains articles by twenty-two generals and five colonels on 'The Aerospace Force in the Sixties.' The lead article is by Gen. Thomas D. White, former Chief of Staff.

"The review is published by the Air University at Maxwell AFB."

☆

USAF's top interceptor outfits met at Tyndall AFB, Fla., at the end of October in William Tell 1961, the service's annual interceptor weapons meet. Final results:

McDonnell F-101 Voodoos

First place: 445th FIS, Wurtsmith AFB, Mich., three missions, 2,600 points; and 83d FIS, Hamilton AFB, Calif., three missions, 2,600 points (Tie). Third place: 18th FIS, Grand

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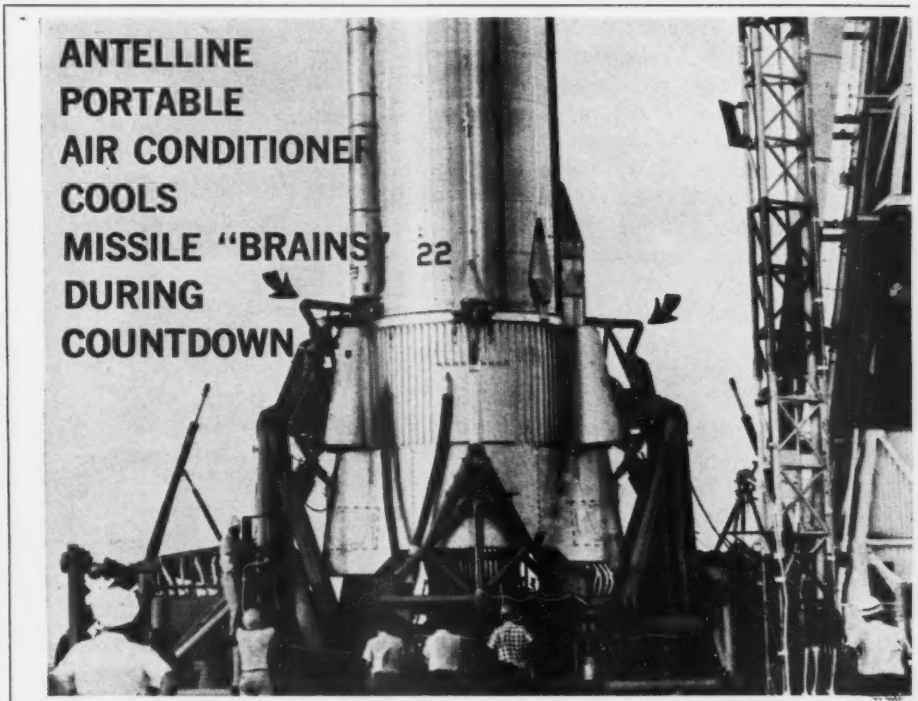

Countdown activity at an Atlas launching pad at Cape Canaveral, illustrating Antelline portable pod coolers attached and operating.

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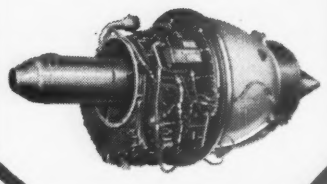

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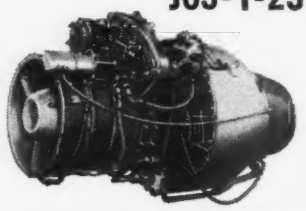

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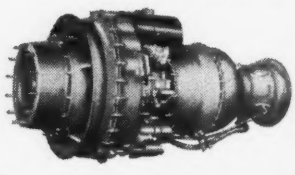

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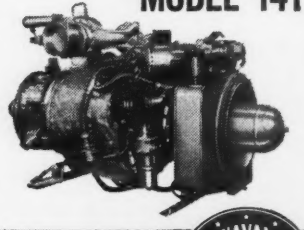

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☆

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Brig. Gen. William E. Leonhard, from Director of Budget, Office, AF Comptroller, Hq. USAF, to Deputy Chief of Staff, Procurement and Materiel, Hq. AFSC, Andrews AFB, Washington 25, D. C. . . . **Maj. Gen. Clyde H. Mitchell,** from DCS/Procurement and Materiel, to Vice Commander, AFSC, Andrews AFB, Washington 25, D. C. . . . **Maj. Gen. William W. Momyer,** from Deputy for Plans, Hq. TAC, Langley AFB, Va., to Director of Operational Requirements, DCS/O, Hq. USAF. . . . **Brig. Gen. Joseph H. Moore,** from Commander, 4th Tactical Fighter Wing, TAC, Seymour Johnson AFB, N. C., to Deputy for Operations, TAC, Langley AFB, Va. . . . **Brig. Gen. Jerry D. Page,** from Deputy Director of Plans for War Plans, to Deputy Director of Plans for Aerospace Plans, DCS/P-P, Hq. USAF.

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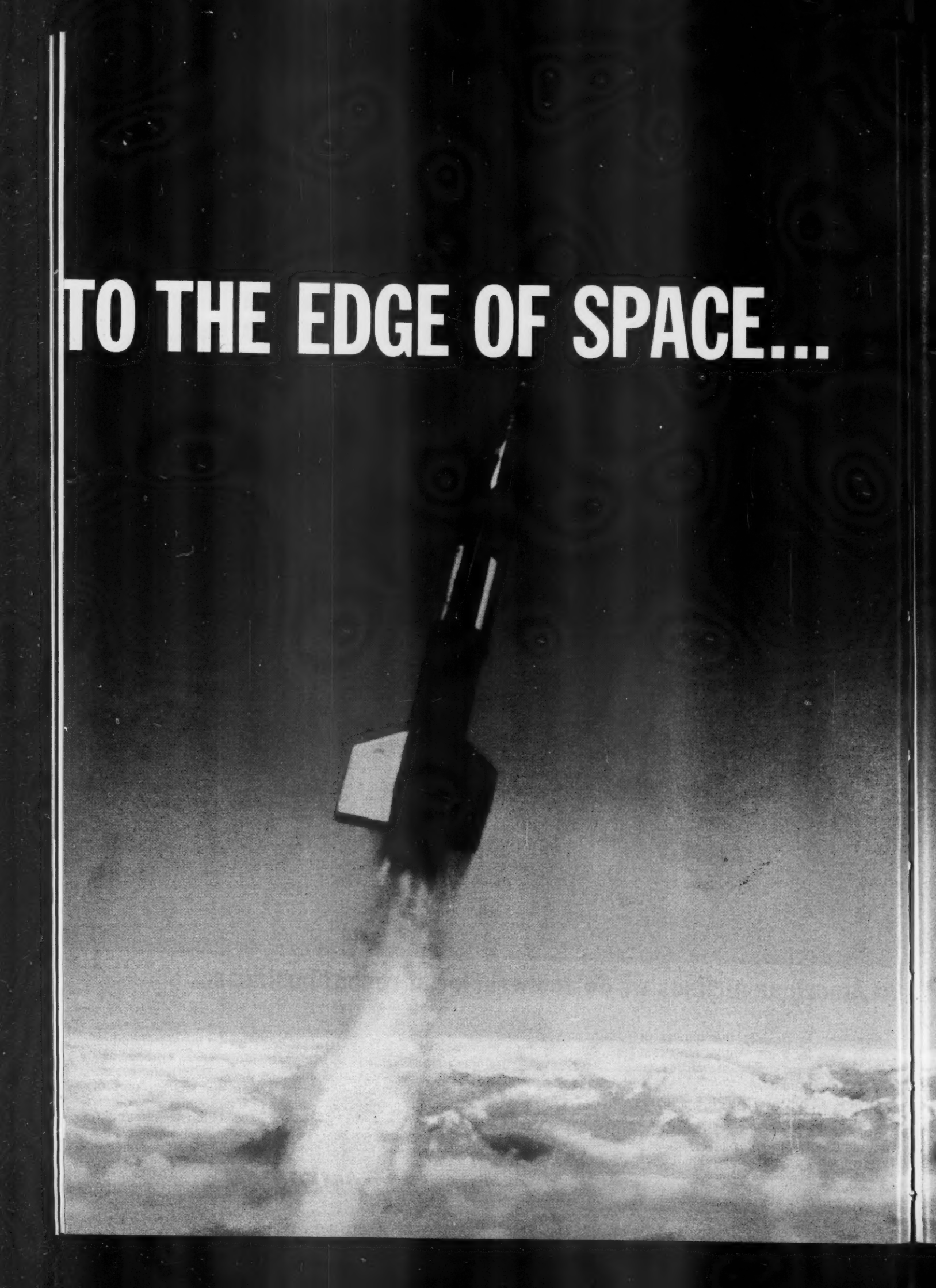

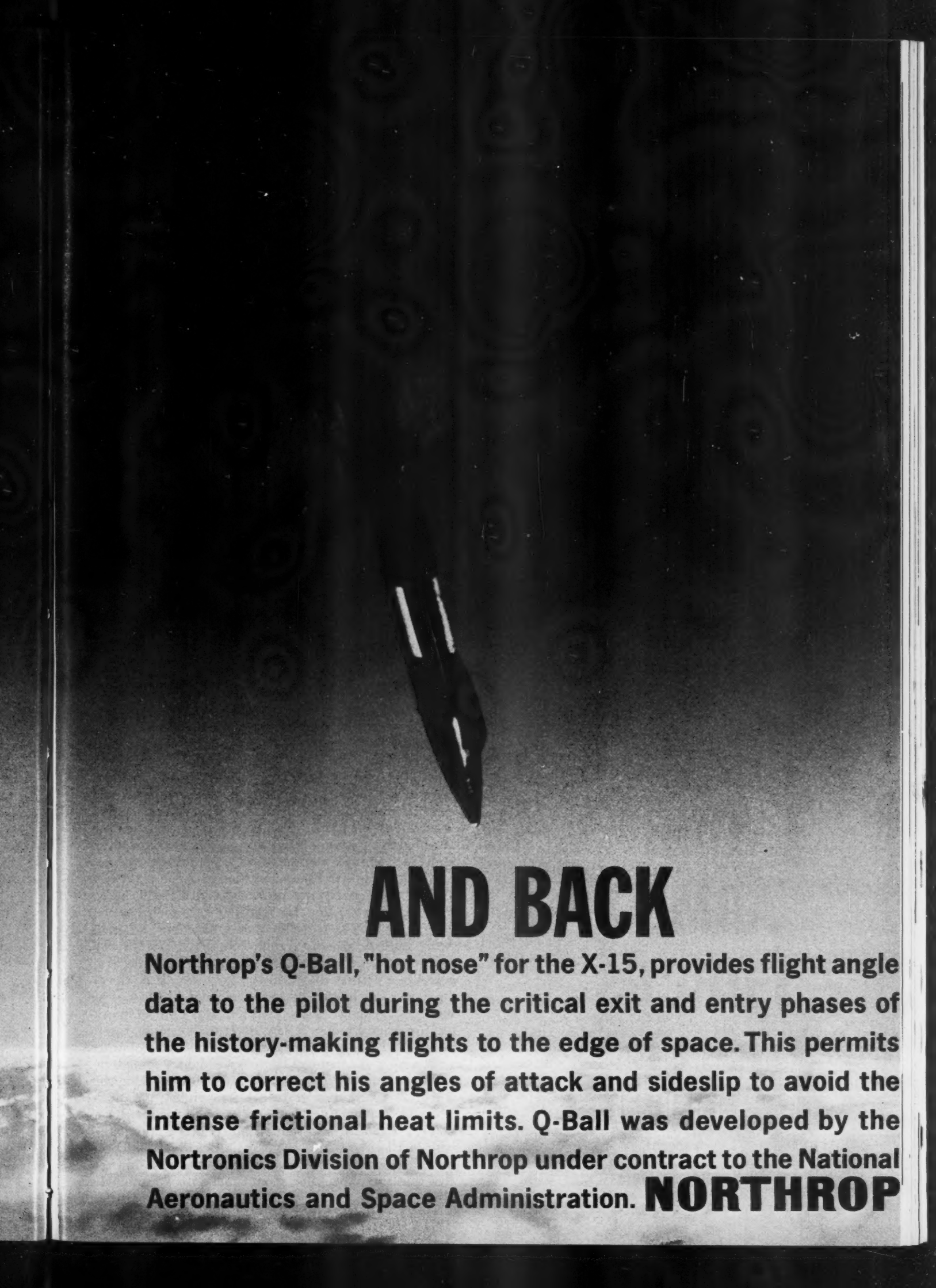

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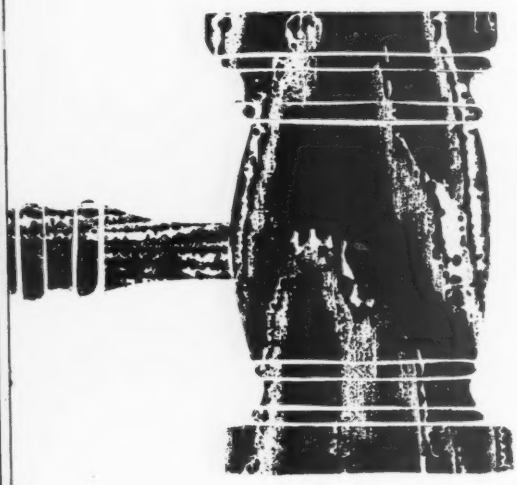
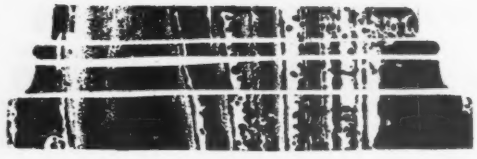
Military Establishment Under Attack

A major paradox confronts the nation. At a time of new world danger and new reliance on our military strength, fears of what President Eisenhower called "the military-industrial complex" have grown . . .

AIR FORCE
DECEMBER 1961



THE CASE AGAINST OUR ARMED FORCES



By Herman S. Wolk

THE United States is confronted with a serious paradox. In a period of unrelenting and heightened danger in which the nation's military may be called upon at any moment in almost any part of the world to act in the country's interest, the military establishment is at the same time under attack from elements within the United States. What is the nature of this attack and its source? Is it valid?

The role of the military in American democratic society was given fresh scrutiny following President Eisenhower's "warning" on leaving the White House. After observing that the quest for peace had been continuously threatened by international communism and that our very survival was at stake, the President took note of what he described as a "permanent armaments industry of vast proportions." While this complex was clearly a necessity, he said, the structure of our democratic society was at stake:

> "In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist."

This statement by President Eisenhower in his farewell address reflected a view that he had held during his tenure in the White House. Whether this opinion originated in Eisenhower's assumption that there was, in fact, a serious possibility of a military coup or whether it was primarily nurtured by fiscal considerations, is not clear. It is entirely possible that both elements were involved. However, it was well established that Eisenhower had for some time been particularly annoyed by pressure from armaments manufacturers and the Congress for increased expenditures devoted to the development of new weapons.

In a news conference of November 4, 1959, he replied to a suggestion by ABMA's Dr. Wernher von Braun (Director, Development Operations Division, Army Ballistic Missile Agency) and ARPA's Roy W. Johnson (Director of DoD's Advanced Research Projects Agency) that the Saturn project should be developed on a crash basis by observing that, "I have never seen any specialist of any kind that was bashful in asking for federal money." The effect of President Eisenhower's speech was to heighten fears and reinforce similar opinions that had been expressed for some time.

Fear of military influence has risen sharply. That this is true in a period of grave danger—while a paradox—is clearly explainable. The impact of President Eisenhower's remarks was significant. Walter Lippmann—who in Eisenhower's last years as President had been highly critical of the Administration—found it "impressive that the old soldier should make his warning the

main theme of his farewell address." The "admonition" of Army Maj. Gen. Edwin Walker, Commander of the 24th Division, for conducting a vigorous anti-Communist program with far-right-wing overtones within his command occurred almost simultaneously with the furor over the far-right activities of the John Birch Society. Militant groups like the Christian Anti-Communism Crusade, the National Education Program, and the Christian Crusade have engaged high-ranking military officers in seminars and conferences.

These events served as a significant backdrop to the issuance of the so-called Fulbright Memorandum, a "Memorandum on Propaganda Activities of Military Personnel Directed at the Public," written by Sen. J. William Fulbright of Arkansas, Chairman of the Senate Committee on Foreign Relations.

The role of military officers in countering communism has been played against the background of a weapons revolution that has forced the United States to reevaluate its basic policy. The tremendous potential for destruction inherent in thermonuclear weapons and the fact that the world has been polarized emphasizes the potential for catastrophe in any world trouble spot. People are naturally and seriously concerned over the possibility that seems to this writer to be extremely remote rather than a distinct probability. Another major reason for an increase in antimilitary sentiment may be traced to a somewhat belated recognition by the American people that large resources destined for the military establishment must not only be continued, but continued indefinitely; and that further defense outlays must of necessity be increased.

This is not a comforting reawakening. In the first place, it means sacrifice. Secondly, there is no end in sight. And to a nation that has consistently sought clear and rapid solutions to its major international problems, it is plainly aggravating and puzzling. There unquestionably exists in America a segment of the populace that, while recognizing the need for a strong defense, is not happy—and never could be at ease—with a significant military buildup. Many of these persons are in responsible positions with ready access to high levels of government and to the mass communications media.

This is not to say that an innate suspicion and uneasiness in the presence of large military forces is by itself wrong or even undesirable. It is, in fact, an American tradition. On the other hand, there is a significant difference between being uncomfortable and suspicious and being hostile and uncompromising. This is especially true in the world that confronts the West in the 1960s. It is of paramount importance that the soldier and the statesman understand each other. Antimilitary bias in the United States today focuses upon three major points:

- That there is the distinct possibility of a political coup by the military.
- That the military is proposing and steadily working for total nonmilitary cold war.
- That the military is undertaking political indoctrination of the civilian populace.

These charges are put forth with sincerity and conviction. It is not the position of the writer that these allegations are either contrived or meaningless. They are serious in content and are deserving of analysis.

Senator Fulbright's memorandum, which climaxed

Yesterday's Cliche All Dressed Up in Today's Jargon

A few years ago C. Wright Mills, a sociologist, wrote a book called *The Power Elite*. It was a fascinating arrangement of facts designed to support the thesis that there is a conspiracy in this country involving our industrialists, our politicians, and our military leaders. There is planning and plotting, Mr. Mills asserted, to maintain national power within this circle, and he placed most of the responsibility on the business and military components. Critics at the time said there was an uncomfortable degree of truth in *The Power Elite*.

The Mills thesis was not new; what was new was the analysis from the standpoint of a sociologist instead of a muckraker or a congressman such as Gerald P. Nye. In the same sense, the current row over some military officers who are inclined to equate social progress with communism and then inculcate the troops with this philosophy also is an old story. It is discussed with deep penetration by Herman Wolk in the accompanying article.

The editors of AIR FORCE Magazine would be remiss if they did not point out that Mr. Wolk has fixed his sight on only one part of the antimilitary spectrum as it exists in 1961. In the highest councils of the government we have one man who has written that the Joint Chiefs of Staff are incapable of coming up with first-class ideas and are wedded to *status quo*. We have another who has been described in the public prints as a strong believer that the American people must free their affairs from what is called the "warrior mentality."

On top of this there is a sustained effort by some members of Congress to deprecate military capabilities in such areas as procurement, technology, and the techniques of management. One House committee, within the past few months, staged an outrageous demonstration over a small R&D contract with Bryn Mawr College. The contract concerned basic research looking ahead to space travel and the word "body" happened to be in the title. Bryn Mawr is a girl's school. The committee whipped up its own ribald laughter at the expense of Air Force witnesses who are competent and underpaid for the kind of work they are doing in the interest of national security. It was not able to find anything wrong with the contract or its results.

Other manifestations of this downgrading of military competence and dignity are rampant. They range from the harassment of retired officers to the periodic attacks on the BX privileges of the ordinary GI.

Among the graduates of a military academy, just as among the graduates of Harvard, MIT, and any other school in or out of the Ivy League, there will develop a small minority of extremists. They may be to the left, the right, religious fanatics, or food faddists. The remainder are the men who hold responsibility for this nation's—and the free world's—security. Basically, as Mr. Wolk points out, their supervision by civilians is ensured by the Constitution. There is nothing there to guarantee them the simple human rights of respect and dignity. This can be given only by their fellow citizens.—CLAUDE WITZE

a series of events that began with President Eisenhower's "warning," encompassed all three points. Senator Fulbright directed attention to these conclusions:

> 1. "Under a National Security Council directive in 1958, it remains the policy of the US government to make use of military personnel and facilities to arouse the public 'to the menace of the cold war.' "
> 2. "Basic material for implementing the policy, under the title of *American Strategy for the Nuclear Age*, prepared and disseminated by private organizations with close military connections . . . can be said to be contrary to the President's program."
> 3. "In at least eleven instances . . . the actual programs, closely identified with military personnel, made use of extremely radical right-wing speakers and/or materials, with the probable net result of condemning foreign and domestic policies of the Administration in the public mind."

Senator Fulbright wrote that his objective was to indicate the danger inherent in educational and propaganda activities conducted by the military and aimed at the public. Further, he would make recommendations for dealing with the problems that have resulted from these activities.

He was concerned that material produced and aimed at the public focused upon an alleged internal Communist threat. Fulbright suspected a direct connection between the 1958 National Security Council directive and the incidence of right-wing military programs. It followed that a major result might very well be serious obstacles to President Kennedy's domestic and foreign policies. To Senator Fulbright the underlying philosophy of the seminars, conferences, and meetings was in all probability "representative of a substantial element of military thought."

In attacking the core background of military officers, he observed that:

> "There is little in the education, training, or experience of most military officers to equip them with the balance of judgment necessary to put their own ultimate solutions . . . into proper perspective in the President's total strategy for the nuclear age."

In addition, while drawing a parallel between the French and American military, Fulbright was concerned with the possibility of the military igniting a conflict either by accident or by design.

Underlying his thesis was the idea that the right-wing military orientation was inflicting upon the American public a "particularly aggressive view" which was not desirable. Thus, Senator Fulbright recommended the following:

- A revision of the 1958 NSC directive based upon the mistaken assumption that the military possessed the background to formulate cold-war policy.
- Such military activity should be brought under civilian control by directive rather than by considering only individual cases.
- The organization, mission, and activity of the National War College should be reviewed.
- The relationship between the Foreign Policy Institute of the University of Pennsylvania, the Institute for American Strategy, the Richardson Foundation, the National War College, and the Joint Chiefs of Staff should be studied to assess whether the relationship condones a policy different from that of the Administration.
- Establishment of a program giving "promising" officers an opportunity for graduate study in history, government, and foreign policy at universities prior to promotion to high ranks.
- Appointment of a civilian committee to review the necessity of education programs for military personnel and to bring the content and operation of these programs under civilian control.

What was the impact and meaning of the Fulbright Memorandum? Any analysis must take into consideration Fulbright's stature as Chairman of the Senate Foreign Relations Committee and his position as a highly respected voice within the Administration's foreign policy advisory core.

In general, the Arkansas Democrat called for a concerted Administration drive to bring the military establishment in line with the President's specific program. At the same time, he went further by suggesting an investigation of private research organizations and their connection with the National War College and the Joint Chiefs of Staff. But perhaps the crucial and most far-reaching point was Fulbright's indictment of the military as being impulsive and incapable of restraint in a time of danger. While the inference was there, he seemed to have stopped just short of suggesting a real possibility of a military coup in a crisis situation.

Charges of a possible coup springing from the American military have lately come from highly respected sources. In a pamphlet entitled *Community of Fear*, published in September 1960 by the Center for the Study of Democratic Institutions, Harrison Brown and James Real observed:

> "Thus, if things continue the way they are going, the eventual possibility of a coup by the military must be seriously considered. Is the general assumption that the American soldier is automatically responsive to his civilian masters correct? We might be rudely shaken were there a serious and clearly visible retreat on the world front by the American policymakers. The same might be true in the event of a disarmament agreement which the military does not consider foolproof."

The last point was also made by Waldemar A. Nielsen ("Huge, Hidden Impact of the Pentagon," N. Y. *Times* Magazine, June 25, 1961) whose concern was directed at the possibility of some progress in disarmament negotiations at Geneva. To Nielsen, the military preoccupation with the cold war meant a "difficult problem" in winning public and congressional acceptance of any disarmament agreement. Similarly, Frederic W. Collins ("Military Indoctrination of Civilians," *The New Republic*, June 26, 1961) has pointed out that the effect of "military intrusion in civilian educa-

tion" is to undermine presidential leadership for peace:

> "Its effect is to rule out any serious search for compromise, to equate negotiations with appeasement, and to create circumstances in which a frustrated public could one day wish to turn to the military for *their* answer to the cold war—the insurrection of the French generals is fair warning."

There are a number of things wrong with these interpretations and assumptions. In the first place, Brown and Real utilize a readily identifiable ploy in asking: "Is the general assumption that the American soldier is automatically responsive to his civilian masters correct?" In asking the question and following it with a qualified prediction, they infer that the answer is in the negative. They offer no proof, no facts to base such an assumption on except that the NATO alliance is geographically dispersed, riddled with political differences, fraught with logistic and communication troubles, and bothered somewhat by language problems. What does history show? Has the United States a history of military coups and attempted takeovers? Collins—like Fulbright—points to a supposedly valid French parallel. The French and American situations are decidely different, influenced as they have been by separate currents, diverse histories, and altogether dissimilar traditions. Gen. Douglas MacArthur differed publicly with United States policy and while not attempting to gain political control, he was summarily dismissed from his multicommand position during the Korean conflict.

Brown and Real are disturbed that a policy retreat of significant proportions by the US might be the signal for a military takeover. The military would be aided by its "alliance" with the scientist-technician. They argue that "should a showdown between the military and the civilian sectors occur, many of the more influential members of this group (scientist-technician) could be relied upon to back staunchly the handlers of the weapons they have so devotedly evolved." No theoretical situations are advanced, however. What connotes—in the collective military mind—a serious retreat? Is there, in fact, a singular unity to American soldiery? Collins has stated that search for compromise and negotiations are in effect appeasement as far as the military are concerned. It may be speculated that successive summit meetings then, constitute a retreat. What of Cuba and Laos? And the Hungarian uprising? Is it necessary to go as far back as the frustrating Korean War? There is abundant evidence that the American military was clearly unhappy with these events. It would not be stretching the point to conclude that the above examples were interpreted by military men as visible softness or retreat on the part of US policy-makers. Yet, no coup was attempted.

It is questionable whether the US military would ever act as one. Certainly the French military has not recently. The attempted coup by the French generals was crushed with the not insignificant aid of the overwhelming majority and power of loyal French soldiery. There are diverse pulls within our own military—within and between services. The latter at times has broken out into open rivalry and public debate. It is my observation that a successful political coup by the US military establishment is a very remote possibility indeed; in fact, so remote as to border almost on fantasy.

Attention has also been directed to alleged interference of the defense sector in disarmament negotiations. Brown and Real have pointed to "domestic forces, largely unspoken, that commit us more absolutely each day to the path away from effective arms control—not to speak of actual disarmament." But the difficulty in pointing the finger at mysterious domestic forces is simply that it misses the crux of the arms race problem. Certainly it must be admitted that defense contractors have a vested interest in the continuance of the spiraling race. But this is the symptom of the disease. The cancer is not the development and production of weapons per se, or even the military's call for larger and more powerful arms outlays, but rather the tremendous schism—ideological, social, and political—between communism and democracy. Sixteen years of disarmament talks have conclusively shown the almost impossibility of negotiating an agreement *prior to* political settlements in the world's tension areas. The basic impediment to a disarmament agreement is not the military-scientific "alliance," but the fact that the Soviet Union and the United States are miles apart in their view of man's relation to human society.

A further direct criticism has been that high military officials have worked toward a total nonmilitary cold war. This is undoubtedly correct. Singled out with the defense establishment have been the Foreign Policy Research Institute of the University of Pennsylvania and the Institute for American Strategy. The Foreign Policy Research Institute has produced two books which have drawn fire from those opposed to total cold war: *Protracted Conflict*, by Robert Strausz-Hupé, William R. Kintner, James E. Dougherty, and Alvin J. Cottrell and *A Forward Strategy for America*, by Strausz-Hupé, Kintner, and Stefan T. Possony. The prime force behind the Institute for American Strategy is Frank R. Barnett, Program Director for the IAS and Research Director of the Richardson Foundation. The Institute for American Strategy conducts seminars on national defense matters. Nielsen remarks that defense spokesmen "reflect a preoccupation with the cold war"; Collins protests against "a total nonmilitary war, in which the civilians must fully engage themselves, against the Communist bloc"; and Brown and Real state, "There is rather clearly a military group emerging in the United States which is dedicated to a position of perpetual hostility toward the Soviet Union and which wields enormous political as well as military power."

Few would deny that this nation is engaged in cold war, a conflict fought with ideological, economic, social, and political weapons, but in which military power is always in the background and is sometimes brought into play. The cold war waged between despotic totalitarianism and freedom is at once a deadly serious and dangerous affair. The stakes are the highest that man can fight for—freedom and human dignity.

(Continued on following page)

The argument, however, is not so much whether we are engaged or not, but whether the war should be total. This point is perhaps somewhat more subtle. It depends, I think, on how one looks at the adversary. If one looks at communism as a force primarily striving to gain social justice, a higher standard of living for its people and greater security for a nation ravaged in the second World War, then the cold war would seem to be something less than total. If, on the other hand, an individual views communism as an international force militantly attempting to enforce its dogma and power upon nations outside the bloc through subversion, deceit, and force of arms, the conclusion on the nature of the cold war will be that it is irrevocably total.

The question remains, which view is more nearly correct? Facts such as the Berlin Blockade, the Korean War, the Polish and East German insurrections, the Hungarian Revolution, and the Tibetan atrocities are there for everybody to see. But in which framework are they seen? Behind one's own value judgments of the objectives of communism lurk one's world view, philosophy of life and history. Bertrand Russell and Prime Minister Nehru clearly adhere to concepts different from those of Winston Churchill and Charles de Gaulle. It is a subjective judgment. But it is difficult indeed for many Americans today—after sixteen years of frustration which includes hot and cold war—to concede that the conflict is not, in fact, serious, dangerous, and frightening. Because many believe that freedom and dignity of the individual and the nation are at stake and that further, the end might come swiftly and horribly, the tendency would seem to be at once one of preparedness and caution; strength to be employed where necessary and caution in not stepping over the nuclear precipice.

Life in the world of the 1960s is not without risk. A thermonuclear holocaust hangs over our heads and is ever-present in our minds. The defense establishment and the civilian leadership of the United States believe that the best way to prevent a total nuclear war is to make it perfectly clear to the Communists that we have every intention of defending and preserving—if not extending—freedom. And here, perhaps, is a crucial point in the divergent philosophies of total and nontotal cold war. The advocates of total cold war emphasize that the *status quo* of so-called peaceful coexistence is not good enough; the democracies must take the offensive.

The aims of United States civilian leadership and those of the military establishment—and overwhelmingly of all Americans—are alike, *i.e.*, the defense of our liberties with honor and without surrender. It would seem that those who often speak so eloquently of tolerance would at the same time concede to the military the right to promulgate a doctrine approaching total cold war. After all, under a republican form of government, there is usually room to correct any prevalent excesses if they exist.

This leads us to a consideration of the charge that military personnel are attempting political indoctrination of the civilian populace. It has always seemed to me that a discussion of this nature involves subtleties that are peculiarly inherent in a democracy. In general, the allegation has centered upon far right wing groups that—in concert with military officers—have held "action" seminars and distributed propaganda to the civilian population. It is the opinion of the writer that these groups have in many instances gone to extremes in promoting their viewpoint. It is not unusual in American history; American civilization has had its share of extremists—both of the right and left. My concern is with the attack upon such organizations as the Foreign Policy Research Institute, the Institute for American Strategy, and responsible and competent members of the military who form by far the overwhelming majority of the defense forces. These institutions are not extremist; they are sincerely and I think correctly concerned with America's position in the world community and with the threat of communism.

Nielsen has conceded that:

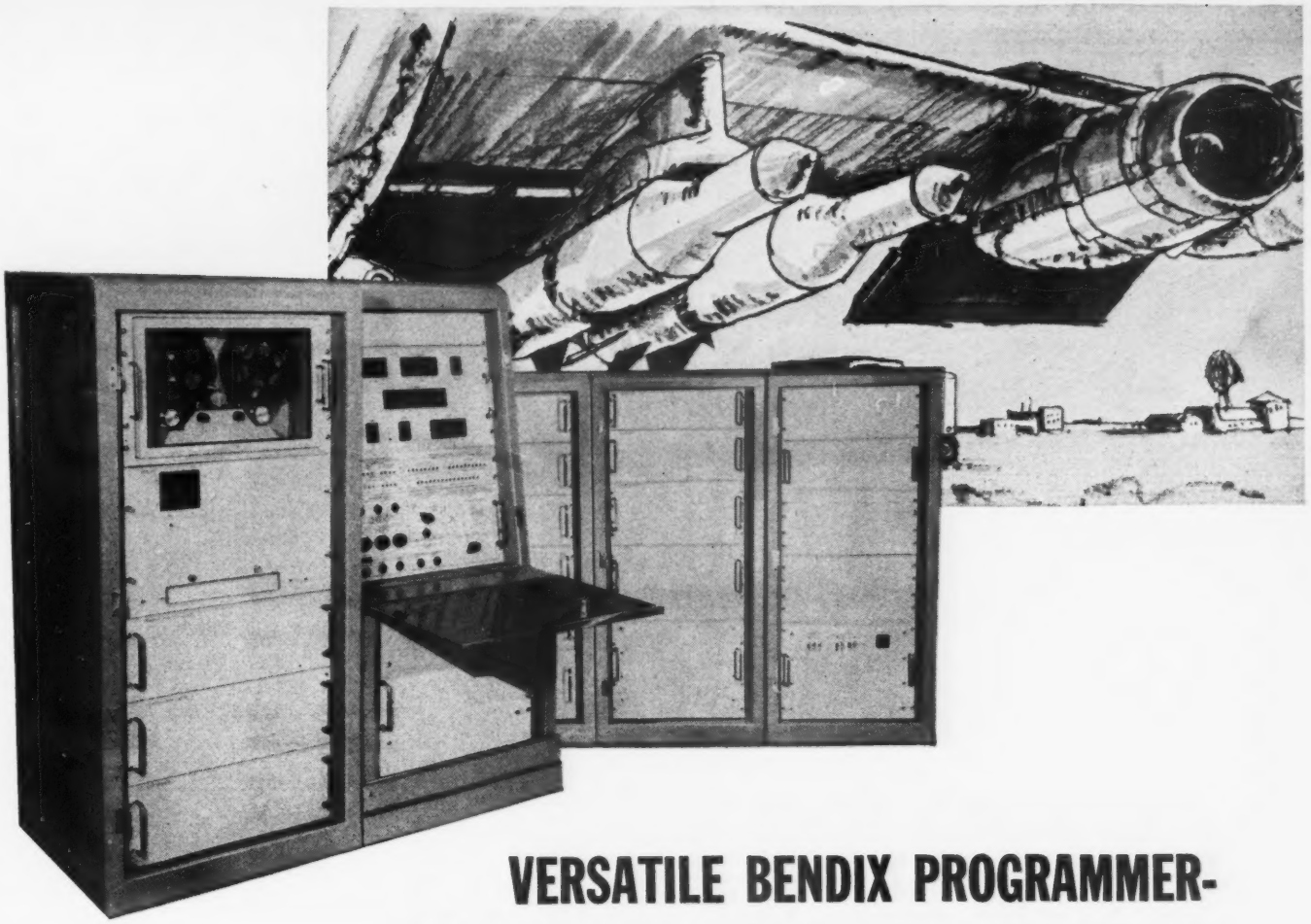
> "Members of the military services who are giving their time and effort to these programs are deeply, patriotically concerned about what they feel is a lack of preparedness in the United States for the world struggle in which we are now engaged. And they have the unquestioned right to express their views."

On the other hand, it seems to me that, perhaps, some concern should be shown when responsible and respected members of the community assert—as Collins does—that "the time has come for some extremely firm indoctrination of military minds by civilian authorities." It is a supreme irony that those who cry the loudest against alleged military indoctrination of civilians should now propose a program similar to that which they so vociferously criticize.

What is essential today is not that civilians and military carp at each other, but rather that they understand and respect one another.

The future of the United States will be decided by the strength and determination which we bring to the task of preserving our liberties. Involved is the resiliency of democratic society. This is a challenge which has absolutely nothing to do with soldiers versus civilians. It has everything to do with the survival of freedom. Should we lose the cold war, we may take perverse solace in the fact that we have no one to blame in large measure but ourselves.—END

The author, Mr. Wolk, has been a historian at Hq. SAC, Offutt AFB, Neb., for the last three years. A native of Springfield, Mass., he served in Army I&E programs from 1953-55, and from 1956-58 was a high-school history teacher in Sturbridge, Mass. Mr. Wolk holds B.A. and M.A. degrees from American International College, Springfield, Mass., and has done work toward his Ph.D. at the University of Washington. He is at present completing work on a book on strategic weapon systems, doctrine, and national policy, scheduled for publication in 1962. Mr. Wolk, his wife, and their daughter live in Omaha.



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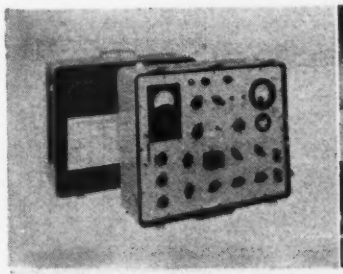

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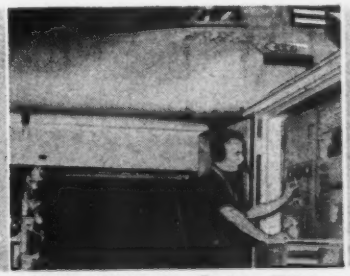

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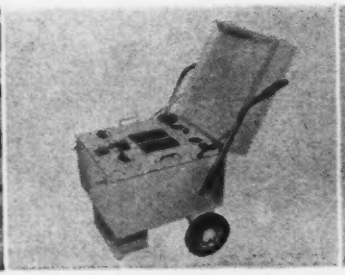
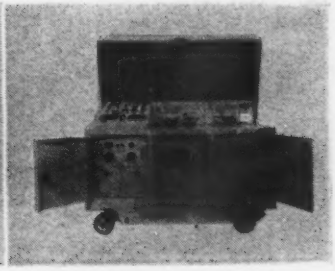


Integrated Instrument Tester. A compact flight line unit used for accurate checkout of air data computers, altimeters, machmeters, and airspeed indicators.



Air Data Computer Tester. A mobile, self-contained unit used on Republic F-105 aircraft; allows accurate testing and calibrating of computers, compensators and converters.

RENDEZVOUS: KEY TO SPACE

Rendezvous in space, now an essential part of the US lunar exploration program, is the key to all long-term manned space missions—military as well as civil . . .

By J. S. Butz, Jr.
TECHNICAL EDITOR, AIR FORCE MAGAZINE

THE FIRST major controversy of the US lunar exploration program has been thoroughly debated and settled with a firm decision.

Officials of the National Aeronautics and Space Administration have chosen the rendezvous technique to send men to the moon rather than using one giant Nova rocket to transport them directly from earth.

The decision is final, and there will be no parallel development, even for a few years, to see if the direct approach might prove the better method. Development of Nova-size vehicles weighing 10,000,000 pounds and more has been pushed back, and they cannot be expected in time for early moon flights.

In the rendezvous scheme selected by NASA at least two payloads will be joined together in space to form the vehicle that will land a US crew on the moon and bring the men back. The payloads will undoubtedly be sent into orbit primarily by the Saturn C-4 booster which will have 6,000,000 pounds of thrust in the first stage, half that of the original Nova discussed by NASA. Payload of the C-4 will be 200,000 pounds in a 300-mile-high orbit, compared to 400,000 pounds for the Nova.

Selection of the Saturn C-4 came near the first of November after three months of intensive discussion by an interdepartmental government committee. This committee, headed by Dr. Nicholas E. Golovin of NASA, was made up of representatives from the Air Force, the Navy, NASA, and the Aerospace Corporation. Consultants from NASA, the military, and industry assisted the committee. NASA management is acting on this group's recommendations.

Basically, the committee's task was to select families

(Continued on following page)

First phase of the US moon flight as now planned is shown in the artist's conception at left. The crew in a flat-topped Apollo capsule is making rendezvous with 200,000-pound propulsion package before proceeding to the moon.

of launch vehicles that would meet the space requirements of NASA and DoD for at least the next ten years. To accomplish this the committee thoroughly reviewed existing US space facilities and capabilities, those controlled by NASA and DoD and those in industry.

In selecting the Saturn C-4 the Golovin committee also made as thorough a system study as possible. It considered the support complex on the ground as much, if not more than, the performance merits of the various vehicles proposed. Predicted reliability of the vehicles and all their systems was another major consideration. Manpower availability and scores of other factors were included in the weighing.

Basically, the vehicles could be separated into two classes—direct flight and rendezvous.

Direct-flight vehicles, which are by far the largest and most expensive per single copy, have the advantage of a relatively small operating base. On the other hand, the smaller, lower-priced rendezvous vehicles will be launched more frequently, and they require more pads, launch crews, assembly and checkout buildings, and the like. These costly ground facilities can easily run the price of a rendezvous operation higher than that for a single-payload, direct flight. But the increasing number of development flights possible with smaller vehicles should improve their reliability and thus tend to lower the cost of rendezvous operation.

Direct flight has the advantage of being unencumbered by the complex task of assembling a spacecraft in orbit. This has never been done, and it could prove to be a good deal more difficult than now predicted in many quarters.

This sort of extended argument in more elaborate form finally resulted in the Saturn C-4 decision.

Several vehicles were considered in great detail, some smaller than the C-4. One of these, the Saturn C-3, could place a payload of 100,000 pounds in a 300-mile orbit. Four of these would have to be launched in close succession for rapid assembly into the moon vehicle. To ensure that the failure of one launch vehicle would not jeopardize the entire mission, at least three and possibly four space payloads would have to be ready for launching at the same time. Obviously the ground coordination and support needed by the C-3 would have been a formidable undertaking.

In a sense the selection of the Saturn C-4 represents a compromise between the extremes of vehicle size and support facility size as represented by the Nova and the smaller Saturns.

One vital technical element in the NASA lunar project remains unchanged. Neither the direct flight nor the rendezvous plans, as now conceived, would be feasible without this vital element—the use of liquid hydrogen and liquid oxygen. If these high-energy propellants cannot be employed in each of the rocket engines used in the lunar flight (except for the first-stage booster engines), then the lunar craft will have to be five times larger. For instance, using today's common propellants—liquid oxygen and kerosene—**a Nova direct-flight vehicle** would weigh around 50,000,000 pounds instead of about 10,000,000. If the old propellants had to be used in the rendezvous concept, the necessary payload in earth orbit would rise from 400,000 pounds to well over 1,500,000.

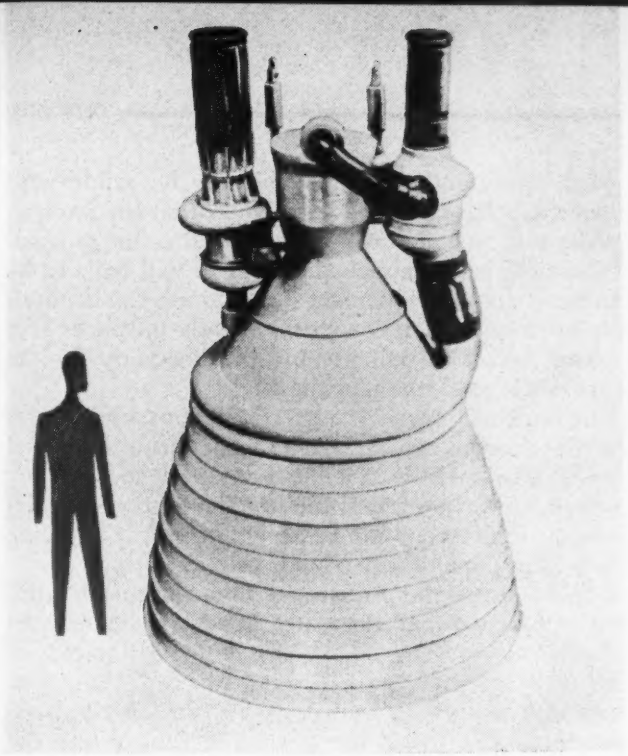
Pratt & Whitney XLR-115, 15,000-pound-thrust, liquid-hydrogen engine is due to fly soon in Atlas-Centaur rocket.

NASA is developing a pair of hydrogen engines to provide the upper-stage capability. These are the Pratt & Whitney XLR-115, developing 15,000 pounds of thrust, and the Rocketdyne J-2, with 200,000 pounds of thrust. Both of these rockets must be almost 100 percent reliable before the moon expedition can be launched. This reliability is the goal of the development program.

The C-4 Saturn was chosen in the face of some strong arguments favoring the Nova. However, the many competent and influential people who have pressed for the Nova were not against rendezvous as such. No one has doubted the necessity of rendezvous. For without perfecting this technique to the point where it can become an everyday operation, the space program, in either its civil or military forms, could never really reach maturity.

Militarily, unmanned rendezvous is in the development stage today in the Air Force's Saint project. The Saint vehicle will be able to maneuver in close to any unidentified satellite and, using a variety of sensors, inspect its payload. Saint would not physically come into contact with the questionable satellite, would not dock against it. More advanced and effective inspection systems obviously will require manned rendezvous and inspection.

Permanent space stations, which have been mentioned for a variety of military and civil uses, could



Second vital hydrogen engine in US space program is the 200,000-pound-thrust Rocketdyne J-2, to fly in 1964.

not be established without rendezvous. With slight modifications such stations could serve as command, reconnaissance, or bombardment posts, or they could function as observatories and laboratories for scientists and development engineers. In whatever mission, the permanent manned station would have to be serviced frequently by resupply, recrew, and maintenance flights.

Without rendezvous it would also be impossible to send rescue vehicles from the earth to save the crews of disabled space vehicles.

Judging from the statements of some NASA engineers, this rescue capability will be developed at an early date and will be an integral part of the long orbital flight training planned for US moon crews.

The need for these rendezvous functions is undisputed, and the arguments for Nova in the early moon flights primarily concern timing of development work. The essence of the position of Nova proponents is contained in a statement by Dr. J. W. Crosby, president of the Thiokol Chemical Corporation: "Such a space capability [direct moon flight] is advantageous because it obviates the undesirable rendezvous philosophy and the attendant assembly-in-space problem, which constitute a severe handicap to space exploration. It is Thiokol Chemical Corporation's firm belief that the less collecting and assembling required in space, the better the chance of success, the higher the reliability, and the less chance of danger to the men participating in these early space operations."

Perhaps the greatest value of the Golovin study and competent dissents such as Dr. Crosby's is to focus attention on the inherent difficulty of managing the lunar project and the entire space program. Booster selection is a complex task, but it is only a part of the problem. There are many possible technical roads to follow to any particular goal. Each road is lined with knowledgeable supporters. The great need is for strong leadership that will select one promising road and stick to it through the troubles that inevitably roughen any development program.

A typical industry statement comes from Trevor Gardner, chairman of the USAF Space Study Committee, in a speech last June: "Compared to the major explorations of history, it is clear that the exploration of the moon, and later the planets, will dwarf all others. . . . None of the recent scientific and technological enterprises—atomic bomb, hydrogen bomb, nuclear-powered submarine, Polaris submarine, liquid ICBM, and Minuteman—compares in magnitude and complexity with the proposed lunar program."

Mr. Gardner went on to say, "Only the most streamlined management channels, centralization of authority [technical operation and procurement], absence of 'kibitzing' by *ad hoc* groups, and the application of our proven management resources developed in the nuclear and missile programs, can ensure success. . . . My general confidence level in the project would be increased if I knew that the management talents of professionals with record of success on technically difficult programs will be fully utilized."

While the present Administration has not followed Mr. Gardner's advice precisely, it is clear that the management challenge has been accepted. The obvious turning point was President Kennedy's special message to the Congress last May 25, when he said, "Let it be clear that I am asking the Congress and the country to accept a firm commitment to a new course of action—a course which will last for many years and carry very heavy costs. . . . If we are to go only halfway, or reduce our sights in the face of difficulty, in my judgment it would better not to go at all."

On the operating side of the program, Vice President Johnson, in a discussion of the immensity of the task, said, ". . . the necessity for making firm decisions, stating clear objectives, and following through on the programs to achieve these objectives is greater than it has ever been before in the history of our country."

In discussing leadership, James E. Webb, the NASA Administrator, recently said, "The objective of the manned lunar exploration within the shortest time possible requires the planning and fitting together of a large number of actions, a systematic organization of the effort, and a constant evaluation of progress. The results and effectiveness of the men and means employed must be constantly reviewed by a leadership capable of hard-boiled adjustment."

The time for prompt, hard-boiled leadership is here, and few delays can be tolerated from the first of the year on if the US is to have a chance of getting to the moon during 1967. There will be no time for major decisions to grow out of three-month committee actions such as the Golovin study.

Now, according to Mr. Webb and Dr. Wernher von Braun, the Rocketdyne 1,500,000-pound-thrust F-1 engine—the program's pacing item at the moment—has progressed to the point where it can be gathered into a cluster of four for the first stage of the Saturn C-4. Work must start immediately on this giant vehicle and continue at the maximum possible rate if it is to fly during 1965 and if it is to be ready for operational use in 1967.

NASA's intention now is to contract for both the C-4

(Continued on following page)

first stage and the Apollo moon-crew capsule before the first of the year.

After selecting rendezvous operations for the first moon flights, NASA has three basic choices of where to rendezvous. As pointed out by Dr. Hugh L. Dryden in congressional testimony last July, we can "... rendezvous in earth orbit ... in lunar orbit, which doesn't seem to offer any advantages ... rendezvous on the moon."

To date NASA hasn't decided which of these methods to employ on the first moon flight. Some NASA engineers predict privately, however, that all three will be used. They believe that US operational space capability will grow more rapidly in the next six or seven years than most people, even those in the business, believe possible today. This growth will make it relatively easy and logical to provide many safety factors for the first lunar mission. Extra fuel and equipment can not only be placed in orbit around the moon for emergency use, but similar emergency loads can be soft-landed on the moon near the spot at which the US crew will land. The emergency equipment would include complete, fueled Apollo capsules which could return to the earth from either the lunar surface or a lunar orbit. Automatic checkout equipment aboard these vehicles could ensure that they were in working order when the US landing crew left the vicinity of the earth.

SPACE VEHICLE SCORECARD

NOVA—Direct-flight lunar-landing vehicle proposed with both liquid- and solid-rocket first stages. First stage thrust about 12,000,000 pounds for liquid version, 20,000,000 to 30,000,000 for solid version. Payload in 300-mile earth orbit around 400,000 pounds.

SATURN C-1—Now under development, the first flight test successful. First-stage thrust 1,500,000 pounds. Payload in 300-mile orbit about 50,000 pounds.

SATURN C-3—Considered by Golovin committee but rejected. First-stage thrust 3,000,000 pounds. Payload in 300-mile orbit about 100,000 pounds.

SATURN C-4—Chosen by Golovin committee for lunar program. First-stage thrust 6,000,000 pounds. Payload in 300-mile orbit about 200,000 pounds.

APOLLO—Multimission reentry capsule ultimately intended to carry three-man crew to lunar landing. Capsule configuration will be flexible and modules may be added to increase its capabilities.

The cost of providing such emergency backup would be small compared to the development cost of the moon program, and it would greatly increase the chances of initial success.

A sizable technology has been built up in the last two or three years on the detailed problems of rendezvous. Industry, NASA, and the Air Force agree that rendezvous in either moon or earth orbits is feasible with current technology. Placing payloads within close proximity of each other on the lunar surface also appears possible.

Most important, the weight penalty for rendezvous is expected to be low. NASA predicts that the payload penalty will be about five percent. That is, the payload of a vehicle being launched into orbit will have to be decreased about five percent if it is to meet and physically latch onto another vehicle already in space. This payload reduction will provide the necessary fuel to perform the rendezvous maneuvers.

The basic conclusions of US rendezvous studies are:

- Rendezvous vehicles can be economically launched from US sites on at least a one-a-day basis to meet any object in an earth orbit. If the urgency of the situation warrants, rendezvous can be accomplished at any time at a greater penalty in payload weight.
- Mid-course and probably terminal approach guidance will be required. In many respects a rendezvous flight, as now visualized, will resemble a typical air defense interceptor flight. Ground-based tracking and computing equipment will participate heavily in mid-course direction to get the ascending vehicle into the proper position for a terminal approach. The main booster will provide control power in this phase. During the terminal phase guidance equipment in the vehicle will take over and a relatively small rocket will be adequate for control power.

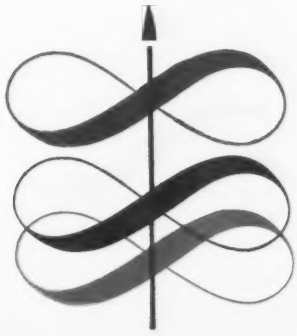
Simulator studies show that a completely automatic system could make the terminal approach and that a man could also accomplish it with a simple display system. The most recent investigations indicate that the human pilot might be able to handle the terminal approach simply by looking out of a window and steering into the target vehicle using stars as reference points.

- Docking or the final joining of two vehicles in space is also considered to be well within the state of the art. Most experts believe that the relative velocity between the rendezvousing vehicles must be brought down to a maximum of five or six feet per second for safety. Since the terminal speed can be controlled to a greater degree than this the prospects seem good for trouble-free docking.

A number of schemes have been studied to bring the vehicles actually into contact. One involves a hook on one vehicle and a trapeze on the other, similar to equipment used when aircraft were launched and retrieved by dirigibles. Another arrangement is to fire a cable between the vehicles. Regardless of the means of establishing contact, the two vehicles will pinwheel slowly as soon as the contact is firm. Some shock-absorbing arrangement will be needed for the initial jolt.

The rendezvous-weight estimates depend heavily upon the use of hydrogen fuel, as do all weights quoted for the moon program. The hydrogen technology needed to achieve these weights, and make the expedition possible is in its infancy. Several delays have already been experienced in hydrogen-engine development, but good progress is now expected for the responsible engineering authorities report that the known problems have been solved. However, the early stage of development raises the possibility of new trouble. —END

THE SPACE AGE IN PERSPECTIVE



SPACE DIGEST

VOLUME 4, NUMBER 12 • DECEMBER 1961

The Challenge of Space
Vice President Lyndon B. Johnson 47
The primary purposes of American space efforts are peaceful, but in a tense world, we cannot ignore the defense potential inherent in astronautics.

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Science Is *Not* Magic
Dr. George E. Valley, Jr. 50
Let's start teaching *why* gadgets work, instead of *how* they work.

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ASK ALPHA:

What's being done to perfect satellite relay for long-range communications?

Many things. An active development program is making material progress toward low-cost systems for communication by passive reflector satellites. / Another project is development of facilities, techniques, and equipment for ground-space-ground transmission of multiple-channel voice and high-speed data./ There's a new 60-foot diameter antenna of very high precision. ☐ It's all happening as part of a continuous program in communication via satellite being carried out by Alpha Corporation and the parent Collins Radio Company. ☐ The antenna—a steerable, parabolic system—is being installed at Alpha's space communication research station in Dallas. Here, the Space Systems Division is enlarging on experiments which already have used the moon and Echo I as relays in worldwide communication circuits. Next step: to transmit multiple channel voice and high-speed data between the U. S. and England, France, and South America, using active repeating satellites and multiple passive reflector satellites. ☐ There's much more to tell. And it's well worth hearing, if you're seeking new techniques, new facilities, or broad systems capability in space communication. Ask Alpha!

Alpha CORPORATION
A DIVISION OF COLLINS RADIO COMPANY

Alpha Corporation • Dallas, Texas • A division of Collins Radio Company ☐

"Our knowledge of outer space, and of activities in space, allows us to say with sad conviction that space systems can be of direct defense importance. Indeed, some defense functions can be conducted with unique advantage in space."

THE CHALLENGE OF SPACE

LYNDON B. JOHNSON
Vice President of the United States

The following is condensed from the prepared text of Vice President Lyndon B. Johnson's address of October 13 to the American Rocket Society in New York City.—THE EDITORS

IT IS the paradox of the space age that the triumphs of science have given mankind new hopes of progress at the same time that they have threatened the world with new powers of destruction.

We want to make the space age an age of peace. We have no desire to convert outer space into a battleground of the cold war. We are thinking of peace, not conflict; of the hope that the gleam of a brighter future may yet fall from the reaches of outer space on our divided and quarrelsome earth.

We shall be discouraged by no disappointments in our search for valid and effective rules of international cooperation that will bring all effort in outer space under the restraints of peace. We ask for no more; but we can never be content with anything less.

In this spirit, even during the uncertainties of the Berlin crisis, I again call upon all members of the United Nations to join in a major effort to establish a far-ranging rule of law for outer space.

The essential points in such an international agreement have long been known. At the very least the nations of the world should arrive at a mutual agreement that information regarding all satellites or space vehicles will be furnished to the international community.

[*At this point in his address, the Vice President departed from his prepared text to comment on military uses of space. See box on page 48.*—THE EDITORS]

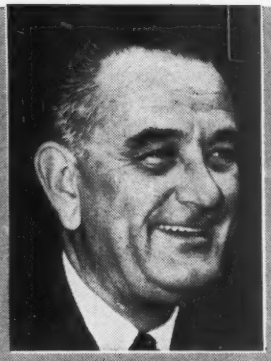
Some day we must come to the further assurance that every object in space has a peaceful purpose and will remain continuously peaceful. By peaceful purpose, I mean to help keep the peace as well as to increase our knowledge for living better in peace.

We know, for example, that one satellite can bring all the varied traffic on the Atlantic or the Pacific Oceans under constant observation.

As a servant of peace, such a satellite can give incomparable service in helping us to interpret and ultimately, perhaps, to control weather conditions. It can link distant nations in a swift system of communication and provide new safety and security for the needs of peaceful commerce.

But as a weapon of intimidation or blackmail, space vehicles can bring dangers of a new and sinister kind to a world that has no desire to experiment with fresh horrors.

There should be no obstacle to the establishment of international rules, preferably under the United Nations, for outer space. We renew our proposals to all members of the United Nations to join with us in making at least a brave start in dedicating outer space to the blessings of peace.



The Vice President departed from the prepared text of his speech to the American Rocket Society to make some significant comments on the role of space technology in the furtherance of national security. The remarks follow:

It is true, of course, that many of the scientific techniques used in civilian research can also be applied to military purposes. But there should be no confusion anywhere about the central principles of American policy. We are developing the peaceful uses of outer space from choice, but we are working on the military uses of outer space from necessity. That difference is basic and not superficial. It is genuine and not artificial, and it is permanent and not temporary. If we could have a world community in which the threat of war no longer existed, in which all nations fulfilled their obligations and lived by the rule of law, then there would be no need to think of outer space in terms of its possible military use. Unfortunately, the state of the world today gives us no such choice. We must therefore take into account both the peaceful and the military uses of outer space. But I think it is well worth remembering for all of us here this evening that the legislation creating the space agency, including the Space Council—made up of most distinguished and respected Americans such as Secretary Rusk, Secretary McNamara, Administrator James Webb, and Dr. Seaborg—placed upon all of the men on this Council the duty, at once solemn and inescapable, of exploring space for peaceful purposes. The Council bears the responsibility in carrying out this task of providing the counsel, for mobilizing the resources of the American scientific community, for seeing that this high purpose of American policy is abundantly fulfilled.

I am confident that all agencies of government will be equally vigilant and active in discharging responsibilities for this national effort.

We can expand the system of control and cooperation as confidence in our mutual purposes steadily grows on the basis of experience. But we cannot wait indefinitely with impunity.

Time presses, suspicions multiply, anxieties accumulate, and opportunities vanish. The necessity of an international agreement becomes more important, and more difficult, as our advances into outer space become bolder and more venturesome.

It is the solemn hope of the American government that all nations will recognize this new opportunity for peace, and that there will be a mutual sharing of the adventures and rewards of making the space age an abundant blessing to mankind.

Our national effort in the space program depends upon the cooperation of the American government and the American community. In the Soviet Union they have chosen a different method. They rely on coercion, not cooperation.

But even though we reject coercion, we must not underestimate some of the advantages which the Soviets have obtained from their dictatorial methods.

They can determine their scale of priorities by the arbitrary decision of the Kremlin. They can mobilize the resources of science and industry by the unchallenged decree of a dictatorship.

The results of this method can already be seen in the Soviet achievements in outer space. We face a determined challenge. After a slow start, and several wasted years, we have now resolved to meet that challenge with all our resources and ability and the determination which we believe is the heritage of free men.

Once again it is a competition between freedom and tyranny, and we are confident that freedom will win.

The latest figures show that the United States leads the Soviet Union by fifty-four to fifteen in the successful orbiting of spacecraft. Our country has an impressive margin of superiority in the information we have gathered about space, and in space programs for communications, weather, and navigation.

But the Soviet Union has the lead in placing large payloads into space. This lead forms the main challenge to our organized national effort and it would be childish on our part to downgrade its tremendous implications.

This year the President has made the basic decisions so vital to a vigorous space program—so essential to freedom's extension into outer space.

The members of Congress, acting on a request by the Administration, have increased the appropriations for the space program by fifty percent. This enlarged program will require an expenditure of about $2.5 billion, and the figure will rise in coming years.

I have been assured by the scientific, engineering, and managerial community that a practical and advanced communications satellite can be achieved in the near future. The President has laid down a policy to encourage the development of such a system into a global network geared to promote the public interest at home and abroad.

The second stage in the development of a space communications satellite would involve the direct transmission of FM programs to home receivers. In this stage it would be possible to broadcast news and concerts from this country to all the world at a very low cost to the receiver.

In time this could lead to the development of a worldwide direct television network. The international advantages of bringing greater knowledge and understanding by this use of outer space, cannot be overestimated.

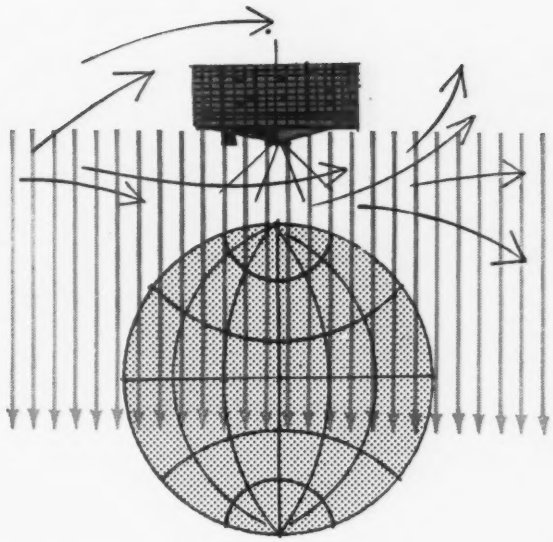
[To speed progress in our man-in-space projects] we must accelerate and improve:

- The development and production of larger and more reliable rocket engines—liquid, solid, and nuclear;
- The planning and activation of rendezvous techniques;
- The exploitation of our space knowledge in communication, navigation, and meteorology;
- The progress in the life sciences;
- The efforts to improve the quality of private industry's production and government's planning and direction;
- The attempts to coordinate intragovernmental activities and to marshal all skills in the national program; and
- The programs to inform the peoples of our own country and the rest of the world of the accomplishments and the necessities of space exploration.

We do not have to wait for the future to unfold the marvels of space. We already have made a small but encouraging start in turning the space age to peaceful uses for the benefit of mankind.

An outstanding example is in the field of weather. Our Tiros satellites are already telecasting information on global weather conditions to any nation asking, including the Soviet Union and all members of the Communist bloc.

This development has more than technical utility. It forms a practical base for improved international relations.



But we must think not only of the storms of nature; there are also the political storms that sweep across our disordered world.

Our knowledge of outer space, and of activities in space, allows us to say with sad conviction that space systems can be of direct defense importance. Indeed, some defense functions can be conducted with unique advantage in space.

These include early warning of ballistic missile attack, various kinds of surveillance and reconnaissance, communications of a secure and invulnerable kind, and navigation. Space programs have benefits which can apply to both civilian and military space efforts.

It is not useful to pretend that arbitrary distinctions can or should be made between the two. The same engineering, the same scientific knowledge, the same values of man in space are applicable to defense and nondefense objectives. The liquid-fueled rockets from our IRBM and ICBM programs, as well as the solid-fuel technology developed in the Polaris and Minuteman programs, all have become a part of the national space effort.

If I could get but one message to you it would be simply this: The future of this country and the welfare of the free world depend upon our success in space. There is no room in this country for any but a fully cooperative, urgently motivated all-out effort toward space leadership.

No one person, no one company, no one government agency has a monopoly on the competence, the missions, or the requirements for the space program. It is and it must continue to be a national job.—END

EDUCATION IN THE SPACE AGE —THREE VIEWS

Whoever wants to believe in magic should not confuse it with science, and whoever believes in science should not confuse it with magic . . .

Science Is Not Magic

DR. GEORGE E. VALLEY, JR.

YOU DO not need me to inform you of the most obvious of all facts: that science and education are inextricably linked; science being today the most important of those cultural heritages which are handed on by education. Education is in turn the most essential factor in the growth of science and the most important member of that complex of intellectual activities which collectively are sometimes called "the scientific method."

So instead, I am going to talk about the influence of magic on science—not centuries ago in the dark ages, but today. It arises from what I have chosen to call "noneducation." By this term I mean neither poor education nor do I mean no education at all; but rather, the process and the results of the process whereby people pick up habits of thought, and occasionally even explicit ideas, which no one, whatever his beliefs, has tried to teach them; and which no one is, again regardless of his beliefs, prepared to defend.

I suspect that there are many such undesirable thought habits and that neither scientists nor educators are wholly immune to their influence. But I have the time and knowledge to discuss here only one: I want to talk to you, then, about a confusion which many scientists are coming to recognize in the minds of nontechnically trained people —particularly in persons of administrative power over science. This is that confusion which impels some people to act as if they thought that science and magic are the same thing, and that the fruits

Three distinguished scientists, all with strong backgrounds in defense science, the academic milieu, and industrial research, examined the impact of technology on education at a Seminar on Aerospace Education, held September 22 in Philadelphia, as an important part of the program of the 1961 Air Force Association Convention and Aerospace Panorama. Condensations of their significant remarks follow.

Moderator of the panel, which featured the three speakers whose ideas you see here, was Dr. Lindley Stiles, dean of the College of Education at the University of Minnesota, and a member of the Aerospace Education Council, strong right arm of the Air Force Association in its continuing campaign to interest and alert educators across the country to the problems of education for the aerospace age.—THE EDITORS

of science, namely technology, are gathered by means of magic. I am sure that practically everyone would deny this confusion in himself, whether he be chairman of a company's board of directors, or of a college's board of trustees, or of one of the government's many important committees.

I am not going to argue with them, but what I shall do is to give some illustrations of seemingly similar concepts of science on the one hand and of magic on the other. You can then decide for yourself the next time you read a pronouncement on science in the press.

I assert that whoever wants to believe in magic should not confuse it with science; and, much more important, indeed, it is of overwhelming importance, that the man who says he believes in science should not confuse science with magic.

I should tell you what I mean and what I don't mean by the word magic. Let's take the last of these first—I do *not* mean in particular all those kinds of magic which are practiced by the backward peoples and are learnedly analyzed by scientists—chiefly anthropologists. The reason I don't mean this kind of magic is that the noneducated among us are not influenced by it; nor are they influenced very much by such esoterica as Graeco-Roman mythology.

But the kind of magic with which everyone is familiar is the magic of the fairy tale and the ghost story: "Aladdin," "Sinbad," "The Forty Thieves," "Chicken Little," "The Salt Machine," "The Monkey's Paw," and so on. These we have all enjoyed and most of us can still enjoy them; but unlike Lewis Carroll, some of us confuse Alice's Wonderland with the Good Earth, and some others perhaps confuse the encapsulation of transistors with the dunking of watches in butter.

A detailed discussion of how people become "noneducated" so as to confuse science with magic would be best left to the social scientists, and I shall only mention my own speculations about it.

It is my guess that there are two main causes of the phenomenon. One of these comes quickly to mind: Whatever of science is currently taught, to those who are not to study it deeply, concentrates today mostly on superficial technique rather than on basic principles—more effort being spent in teaching *how* gadgets work than on the basic principles which explain *why* they work. The second reason is less obvious, but I think it is that the fairy stories and fantasies of literature are not themselves taught well enough. Their values for teaching moral precepts are glossed over, but enough of the action of the story remains in peoples' memories to foster half-baked comparisons with their equally poorly understood observations of the real world. Since in addition to these influences it is unpopular these days to believe in magic, and it is to the contrary very popular to believe in science, we can have large numbers of people who say they are for science, who believe they are for science, but who nevertheless really believe in magic.

Let me illustrate these observations in more detail.

One of the basic ideas behind magic is that you

get a big effect for a small effort. The small effort is usually called "casting a spell" or "making an incantation." The process consists of saying certain words or of making certain gestures or the burning of incense and of other relatively untiring activities carried out either singly or in combinations. As a result of these small actions one achieves whatever one desires, and hugely.

Now technology, which is the fruit of science, can also yield big effects for a relatively small effort.

For let us suppose that a necromancer can utter some magic words and as a result gain knowledge of a far-distant place. Then how does this differ from using the long-distance telephone?

It differs in three ways: (1) The words required to activate the telephone are not held secret and are accessible to anyone who can read the phone book; (2) the magical effect goes on to the benefit of the magician without the efforts of any other humans, whereas the telephone system is constantly attended by tens of thousands of other people, so that although the effort may be as small for the telephone user as it is for the magician, the totality of human effort involved in the telephone is very much greater; and (3) the magical process is specific to the desires of the magician—*he* is supposed always to learn what *he* wants to know; whereas the telephone user can learn only what the person who answers wants to tell him.

Let me now take an example from the field of transportation. As we all know, in a number of laboratories people are experimenting with machines intended to understand the spoken word. Such machines are needed to serve as mechanical stenographers, to transform spoken numbers into the rotation of knobs as in the tuning of a radio set, and so on. It is quite conceivable, then, that in the reasonably near future, the automatic pilot of an airplane will be made adjustable by spoken commands.

Then how will such an airplane differ from a magic carpet, a vehicle traditionally guided by voiced commands?

In several ways: First, and most importantly, magic carpets are infallible; for instance, who ever heard of a magic carpet icing up? Second, and almost as important, there are many airplanes, available to all, and the words to command them are unlikely to be secret—this is the same characteristic which telephones have, you will recollect; third, airplanes, especially when they travel as fast as magic carpets, require a great deal of protection for the passengers: oxygen, windshields, temperature control, and so on; fourth, an airplane, whether under automatic control or not, requires a great deal of human effort and vigilance, both in the air and on the ground.

So much for word spells; now let's consider effects produced by motions of the hands and other parts of the body.

Recollect that when Aladdin wanted to go to Africa, he rubbed his ring and told the genie of the ring to take him there. Thus by a simple motion of his hands he acquired a very powerful mode of transport. But each of us has in his pocket a small metal object with powers like Aladdin's ring; true, rubbing it won't do you much good, but if you put your ignition key into the lock of your car, you immediately have at your command the strength of hundreds of horses. The effort is not much greater than Aladdin's, I think you will agree.

So how does this differ from magic? In just the ways described before: It's not specific to you, nor is it secret; the car requires the continuous attention of its driver; innumerable people are involved in it—the oil refiners, the filling station operators, and many others including the traffic cops. Who ever heard of a genie getting tagged for speeding?

Now for incense. Incense is usually described as being involved in the raising of evil spirits—the magician typically draws a magical diagram on the ground and burns the incense in it; then the earth opens. How does this differ from atom bombs whose design involves a good many diagrams and which depend for their effect on the burning of a small amount of uranium?

In just the ways already described: lots of people involved, not specific to any one person or country, and so on.

Another kind of endeavor common to both magic and to technology is the process of prediction. Typically the gypsy looks into the crystal ball and predicts that Susie Jones will meet a tall dark handsome man; also typically the astronomer predicts the eclipses, the gunner predicts the impact point of his shell, the engineer predicts the performance of a machine; moreover these predictions are specific.

But the differences are nevertheless profound: *First,* the magical prediction is specific to an individual human whereas technological predictions are always specific to a set of circumstances. Even when the doctor predicts the state of health of the patient, that prediction is not specific to the patient himself but to his symptoms and bodily

makeup. *Second,* the predictions of technology are never exact, but always involve a margin of error; and it is the main characteristic of the so-called "exact sciences," not that their predictions are necessarily more perfect, but that their understanding of their own imperfections is deepest.

Thus we can sum up the characteristics of science and technology as they differ from those of magic: (1) No fact of science or product of technology, however, it may be classified, can be known to but a single man; (2) the benefits of science and technology can accrue to any one of us only through the cooperation of many people; (3) the benefits of technology can accrue to a particular person, Mr. "A," not simply because he is Mr. "A" but because he is enabled to place himself physically in position to receive those benefits; (4) the devices of technology are fallible—sometimes they need repair; (5) the knowledge and the predictions of science are never perfect, perfection being regarded as an approachable but unattainable limit; (6) technological devices, unlike magical ones, do neither protect their users from harm nor do they necessarily cause harm to people; (7) and most important, perhaps, from science and technology you don't always get what you want. All you can have is what men know how to make possible from their always-imperfect understanding of nature.

Now pity the poor scientist or engineer whose misfortune it is to be administered by one of the "noneducated." For typically he will be offered all the money and room and help and sometimes honor he wants—if only. . . .

If only he will be a genius like Edison and discover a perfect cure for cancer without worrying about impractical ideas about the fundamental nature of life.

If only he will make an antigravity machine, for "after all they finally learned how to make gold, didn't they? You scientists just need to be told what to discover, that's all."

If only he will make machines which never go wrong so that more and more of them can be used for trivial purposes.

If only he will make it good for *me* and *me* alone.

Well, it can't be done that way, and technologists, their bosses, and the general public will be far better served when everyone shows by his actions that he understands that science is not magic.—END

Dr. Valley is a professor of physics at Massachusetts Institute of Technology and a former chief scientist of the Air Force who has worked in radar development, nuclear energy, and a number of other defense science areas. He has been intimately connected with MIT's Lincoln Laboratory since its inception. He received his Ph.D. in physics from the University of Rochester in 1939, and was appointed to MIT's faculty in 1946.

In an age where science has developed vast capabilities for the transformation—and possible destruction—of all our works, we must face the question . . .

What Is an Educated Man?

DR. IVAN A. GETTING

FOR MANY centuries the favored few—the sons of the nobility and the gentry—were considered "educated" when they had become conversant with Latin and Greek, were familiar with the writings of the ancient philosophers, and had a knowledge of ethics and theology. During the last century, the number of "educated" youngsters has increased enormously, but the classical tradition of education has continued to the present.

There are many who even now advocate the liberal-arts college with a curriculum clinging stubbornly to the ancient traditions as the only true source of learning. To such educational traditionalists, the schools of science are trade schools where true culture is nonexistent or at best exists by sufferance.

At the other end of the spectrum are those who assert that the tremendous strides of science in the past century have revolutionized our economy, our systems of communication, and our modes of travel, have improved our health and material welfare, and have also brought about the means of world suicide through atomic warheads delivered by "ultimate weapons." In their view, science, as the most potent element of our life today, should be the backbone of our educational system. To them, Latin and Greek are dead languages, and ethics and theology are better left to the Sunday School.

Fortunately, in a free society there is room for all opinion, but it is nevertheless interesting to speculate on what is education and what is an educated man. It seems to me that education consists of roughly three parts: first, the learning of the basic three Rs—reading, 'riting, and 'rithmetic; second, storing up a catalog of useful knowledge; and third, learning how to think logically. The better one has mastered these three elements, the more educated that person.

Let us now analyze the classical education—of Latin and Greek, of ethics and theology, of philosophy and history. It is immediately and abundantly clear that a person educated in this curriculum has learned to read and write, he has stored a vast amount of knowledge, and he has learned to think. The study of any language—live or dead—is a stimulating mental exercise. The human brain reacts to challenge and use through the thoughtful reading of the words of past scholars. The writing of essays will also sharpen the mind.

The person so educated certainly is literate, and he has mastered and stored many involved thoughts. He recognizes immediately an Oedipus complex without needing someone to draw a diagram or give a detailed explanation in monosyllabic words. He is able to think quickly and to draw judgments from the experience of others, and he can communicate his own complex ideas to others similarly educated.

On the other hand, the chances are overwhelmingly high that he will be—to use a lame but hopefully understandable phrase—a mathematical illiterate. A half century ago, such mental poverty was hardly a handicap, and even today there are millions of grown men—mathematical incompetents—who are managing to survive in the face of this handicap. But not tomorrow, and really, not today. Our educated man must become bilingually fluent; he must be equally adept and perceptive in the transmission of concepts expressed in mathematical terms as well as the reception of thoughts conveyed by the written or spoken word.

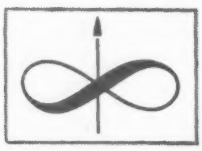
Now let us turn the coin and consider education based on science. A person so educated must necessarily, like his classically educated counterpart, have learned the three Rs. His storage of knowledge, however, for the most part will have been of facts based on physical experiments, and he will have sharpened his mind and learned to think in the terms of the logic of mathematics.

He, too, is able to express complicated thoughts, but because mathematics is so powerful and so logical a language, he is often able to clarify ideas that must remain obscure to the classically educated man. And in a world now dominated by scientific advances, he certainly is in a better position to understand many aspects of his environment.

But there remains much in the experience of man which is not susceptible to expression in mathematical language—much that the educated man must also know about and understand if he is to cope successfully with the critical problems of today's troubled world. The *what* and the *why* of the vicissitudes of the Greek republic, the prospering and decay of Roman civilization, and religious struggles of the Reformation—these lessons of the past can teach as much, but they are too difficult to be expressed in terms of differential equations or programs on a digital computer.

Admirably accomplished though he may be in the art of communicating his knowledge in mathematical terms where the problem lends itself to such analysis, the man whose education is today totally based on science is likely to be as inadequate on the whole as his classically educated friend.

The graduates of these two extreme educational systems are perilously close to the impossible dilemma of seeking to communicate with one



Analyzing the impact of the aerospace age on education at AFA Seminar in Philadelphia were, left to right, Dr. George E. Valley, Jr., MIT; Dr. Ivan A. Getting, president, Aerospace Corp.; Dr. Leonard S. Sheingold, Chief Scientist, USAF. Moderator, standing, was Dr. Lindley Stiles, dean, College of Education, University of Wisconsin.

another in tongues as strange and incomprehensible as those we may one day hear when we visit Mars or some far-distant extrasolar planet.

The answer to the dichotomy is, of course, quite clear. The basic curriculum of education should be changed. And as those whose profession is education should know far better than I do, it *is* being changed. Instead of higher mathematics and science being tolerated like painful carbuncles on an otherwise healthy body of the so-called classical academic curriculum, they are becoming recognized as fundamental and integral parts to be nourished throughout the entire educational cycle. And in the regime of science-based education, the social studies, history, philosophy, and economics are being emphasized. On both sides of the educational fence, this is as it should be, only in my opinion, more so!

Which brings me to two related thoughts, one having to do with a growing pain that results from these efforts to provide our youth with a bilingual education; the other with a "what are we going to do about it?"

The growing pain is, in my opinion, evidence of a trend which has characterized the thinking of some educators at university levels—particularly in our scientific professional schools. I realize that what I am going to say may run counter to my earlier remarks about the essentiality of providing a total education, but certainly nothing in those remarks could have been taken as a sympathy or an espousal of the idea that our educational process can be permitted to become superficial.

Consider for a moment the concept that every student should cover the waterfront in once-over-lightly fashion. The corollary is that this waterfront covering is best accomplished by orientation courses or by survey courses or by watered-down courses which never spend enough time on any one subject to give the student more than a nodding acquaintance. In one of our major eastern universities, the exposure of a physics science major to the entire field of chemistry can be as little as one term. This twelve-week term covers inorganic chemistry, physical chemistry, nuclear transformations, and a few other incidental items. In some of our scientific schools, modern wave mechanics is introduced before the student has even a firm grasp on simple classical mechanics. By the time a student graduates, he has had a taste of everything but a meal of really nothing. You could call it educational chop suey.

I plead instead for recognition that university scientific education should be in depth. Becoming a scientist is a discipline. The mind must be trained so that the scientist can apply productively the skills and the knowledge he has learned. It is not enough to be able to carry on a tea-time conversation. The education of a scientist or engineer, I submit, requires concentration and study in depth.

This raises the fundamental question: Is such a scientist or engineer "educated" in the broad sense of the word? In my view, anything short of this deprives the student of his rightful education. Only by pursuing a scientific or some other disci-

pline to a real depth can there be established in the mind of the student an appreciation of the beauty of the world in which he lives, and understanding of his power of analysis, and a humility in the face of how much he has yet to learn. Such a person is genuinely "educated" in contrast to the dilettante who knows a little about a lot. Study in depth in at least one discipline makes it possible for such an educated person to move with some degree of assurance into related fields. From experience, I can say I would rather hire a scientist with one well earned Ph.D. degree than one with three B.S. degrees.

Here you may say: "If we must not only provide a bilingual education—both the essential best of the traditional classical curriculum and the new of the science-based schooling—but at the same time encourage the student to delve deep into his chosen discipline—well, aren't you being a trifle unrealistic? Isn't it a little like trying to force a quart of liquid into a pint jug?"

The answer is partly "yes." We must at all times reexamine school curricula to make sure that the liquid going into the jug is the best suited to provide education within my formalistic definition of improving the mind and at the same time fitting the person for the present world.

But it would be unrealistic if our education processes failed in the future to make full use of the new teaching tools that can be developed from today's technology. We recognize on every hand the results of the scientific revolution; it is high time for us to make use of those results in the education process.

Actually, little has happened in the mechanics of teaching since Comenius introduced the printed textbook into classroom teaching. To be sure, such visual aids as movies and closed-circuit tele-

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The dynamic growth of technology has created new problems and highlighted old ones. There are three danger symptoms which bear careful watching. These are . . .

Migratory Workers, Triple-Threat Professors, and the Lost Half

DR. LEONARD S. SHEINGOLD

SINCE the Air Force has a vital interest in all aspects of technology, my remarks will consider the impact that a broad spectrum of technology has on education. This would include:

- *Basic research*—a search for new concepts and principles to increase our fundamental knowledge.
- *Applied research*—investigation of the application of new principles to practical ends.
- *Engineering*—the art and science of making products or "hardware."

This year the Air Force will spend $50.5 million for the support of basic research. About sixty-five percent of the support for fundamental work will go to universities in this country and abroad. In addition to this investment in basic research the Air Force will also spend $244.2 million in the applied-research area. This considerable investment will be supplemented by a much larger amount to be spent in the development, engineering, and testing of new products for our national security.

The reason that the Air Force supports such a wide range of technology is to diminish the time interval between discovery and application so that we may compete with the Sino-Soviet bloc.

The marked reduction in time from basic research to application has had important effects on the relationships between the engineer, the scientist, and the military. Until World War II there was sufficient time for the engineer to absorb re-

vision have been recently added, but these are hardly more than modern dress for the old-fashioned textbook and blackboard lecture.

What is needed is a quantum jump in teaching techniques. Fred Skinner of Harvard has foretold the coming revolution in teaching mechanics through the use of teaching machines. To me at least, it is clear that the marvels of electronics and digital computers can and will result in a major revolution, at the same time eliminating much of the back-breaking drudgery of teaching.

Students—their capacity to learn has repeatedly been demonstrated to be far greater than what is now demanded of them—will learn more, faster, and better by matching their wits where appropriate with central computers programed in response to the best pedagogues and scholars. Teachers, in turn, will have more time to devote to the more challenging—and rewarding—aspects in the relationship between teacher and student.

Doing what must be done to ensure that today's youngster becomes the educated man fitted to the world in which he lives is, in my opinion, our most urgent problem. It may well be that our national survival may be dependent upon how completely we accomplish this educational revolution.—END

Dr. Getting is president of the Aerospace Corp., of Inglewood, Calif., a native of New York City, and a graduate of Massachusetts Institute of Technology and Oxford University. He has a long and distinguished record in defense science, served with the famed Radiation Laboratory during World War II, which perfected wartime radar. From 1945-50, he taught at MIT.

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sults of new basic knowledge without daily contact with basic research progress. Since World War II there has been a profound change in this situation. As you may well imagine, the compression of time coupled with increasing complexity of weapon systems has resulted in tremendous demands for scientists who are also application-oriented and for engineers who can readily adapt to new technology. Technical achievements such as the atomic bomb, radar, and earth satellites have witnessed the rapid injection of new science into technology and the close working relationship between scientists and engineers. It is because of the possible immediate military importance of almost any advance in science that the Air Force maintains the best possible communications with universities and the scientific community.

The number of competitors for the nation's valuable scientific and engineering talent is continually increasing. Broadly today, there are five classes of competitors. They are:

- Department of Defense (Air Force, Navy, Army).
- Other government agencies (NASA, Atomic Energy Commission, etc.).
- Industry.
- Universities.
- Nonprofit organizations (Aerospace Corporation, Lincoln, RAND, MITRE, etc.).

Only recently General LeMay, Chief of Staff, USAF, expressed his views on the subject of trained technical personnel. He said, "Obviously, we need high-caliber people to develop, maintain, and operate the complicated weapon systems we have now and the ones that are coming along. We need a lot of technical and scientific people. But the country produces only a certain number, and everyone competes for their services."

It is easy to show that if we are to depend only on sheer numbers of scientists and engineers, over the long haul we cannot possibly match the combined Sino-Soviet potential. If we assume that an equal percentage of scientists and engineers are trained in each country, then eventually there will be about five Communist technologists for every one of ours. Furthermore, if we continue to keep women out of the engineering profession, then the unfavorable ratio will double. Our only hope lies in our being extremely efficient by exploiting all of our technical resources, and by improving our quality. (Of course, working longer hours would also help considerably.)

The dynamic growth of technology during the past ten years has created new problems and highlighted some old ones. There are three danger symptoms which bear careful watching. These are characterized by "the migratory worker," "the triple-threat professor," and "the lost half."

The Migratory Worker

The growth of defense industry in this country has resulted in a situation where a large number of scientists and engineers move constantly from one job to another and from one city to another. These migratory workers take on new jobs at fre-

Raytheon solution for space

Recovery of space vehicles is a long range problem, commencing at atmosphere entry. Techniques for control from re-entry through touchdown, developed by Raytheon, are comparable to GCA concepts. Over the past two years, Raytheon has conducted a major and continuous investigation of the means by which a manned maneuverable space vehicle can be returned safely from flights in space to normal routine landing on earth. These investigations have included operational control concepts, instrumentation, information flow analysis, basic system requirements and subsystem specifications.

Part of this effort was a space vehicle recovery study for the Air Force Flight Test Center encompassing vehicle energy management, glider characteristics, trajectory analysis, flight parameter accuracies, range instrumentation, navigation, communications, data processing display, and human factors.

vehicle recovery: LONG RANGE GCA

Other portions of the effort included earth return navigation and recovery studies for SLOMAR (as a subcontractor to the Martin Company), and joint efforts with Bell Aerosystems Company on DYNA-SOAR Terminal Navigation Systems.

Currently, major emphasis is being placed on the APOLLO Ground Operational Support System (GOSS). This system will include global range instrumentation for tracking; telemetry and communications; and control, display and computation centers.

One of the world's largest scientific-industrial organizations, Raytheon has proven capability to create the required technology and manage every phase of a space vehicle recovery system — from early study and design through development, production and field support of operational systems and equipment.

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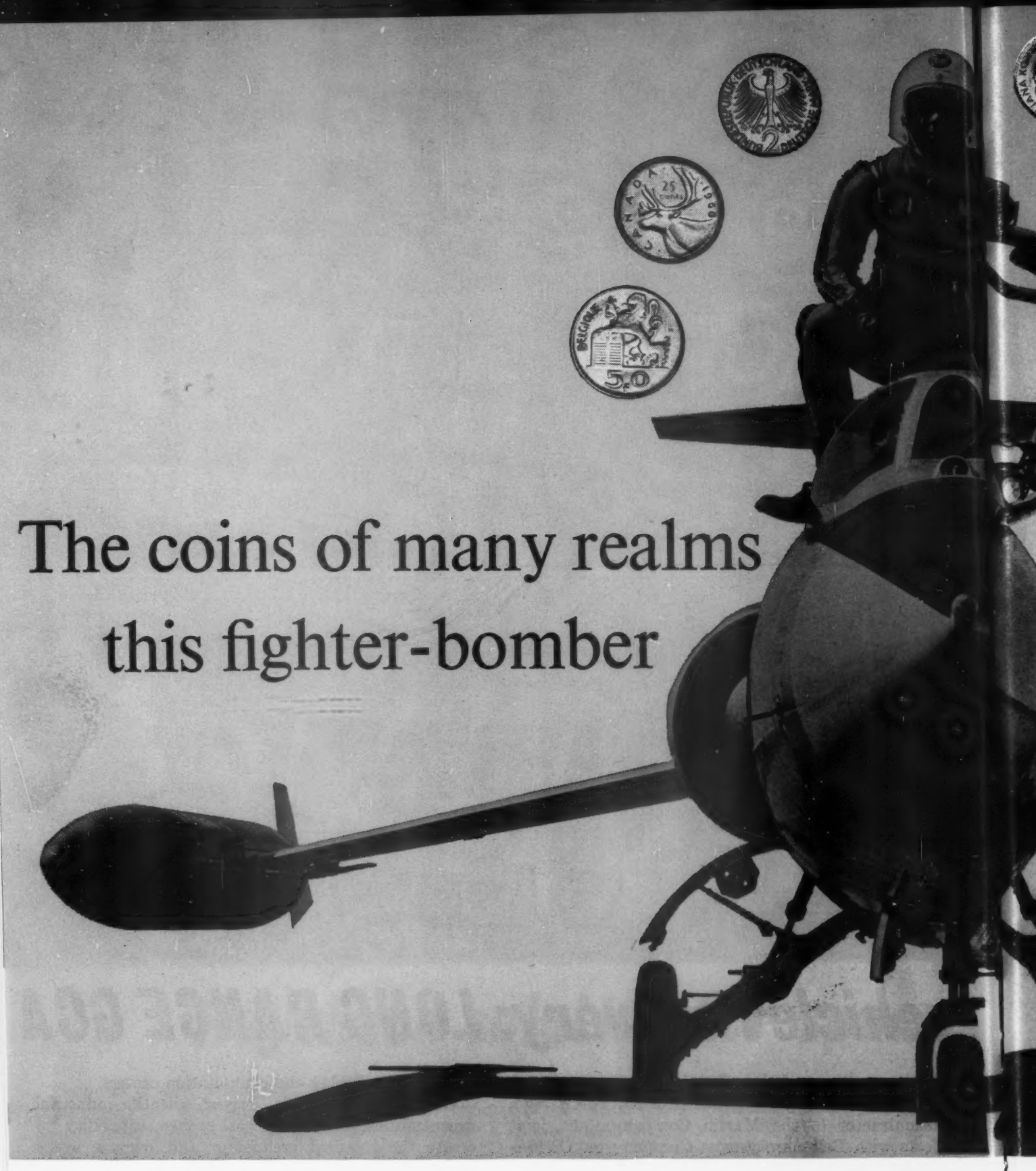
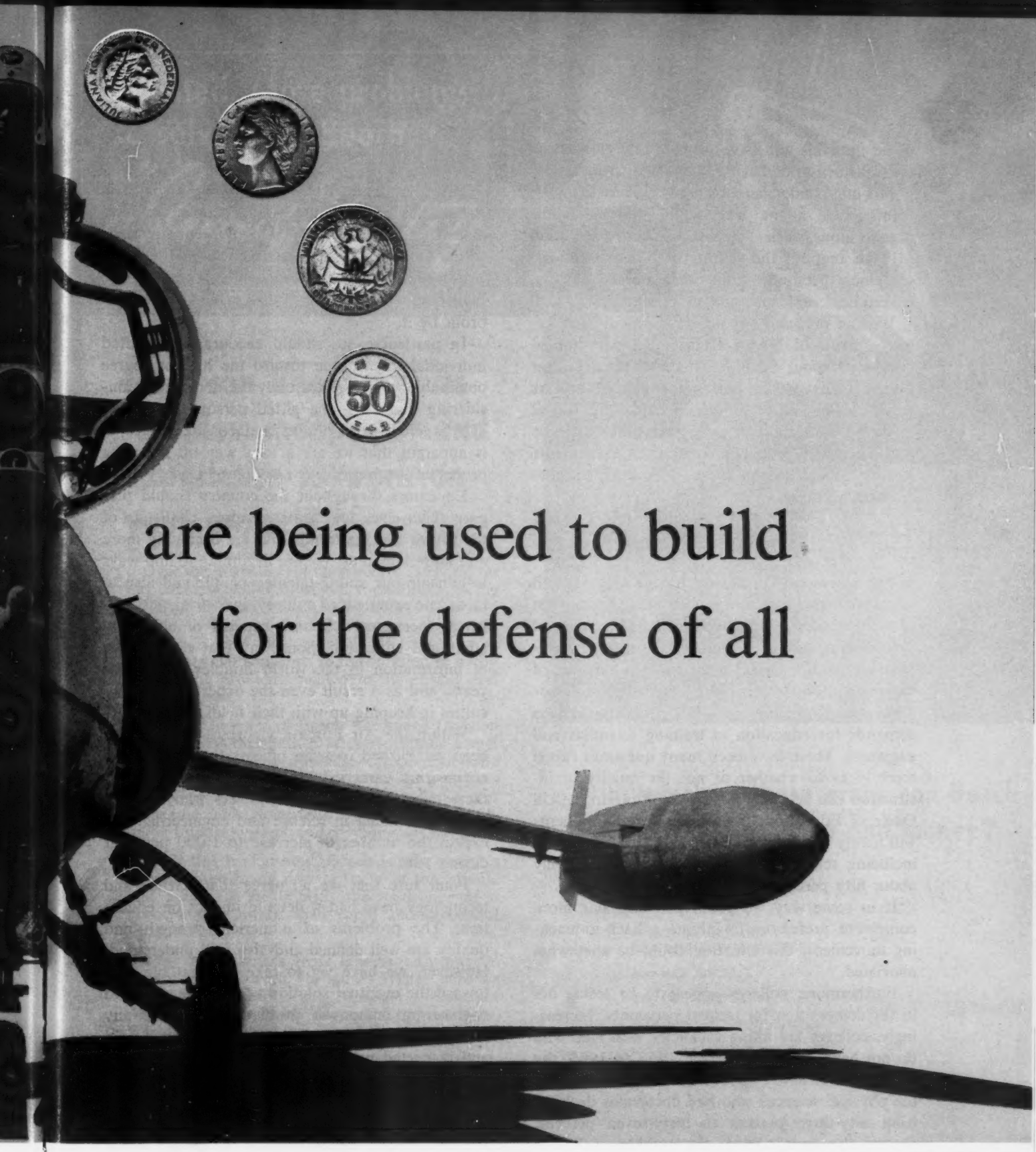


The coins of many realms this fighter-bomber

With their own money, seven Free World Nations—Belgium, Canada, West Germany, Italy, Japan, The Netherlands, and the United States—are building this airplane in their own factories.

It is the Super Starfighter, a much-advanced version of the original U.S. Air Force F-104. It is the best multi-mission aircraft in the world today.

By simply changing black boxes and weapons, the Super Starfighter can be converted quickly from fighter-bomber to interceptor . . . or strike bomber . . . or reconnaisance plane. It comes amazingly close to matching the big single-mission jets at their specialties. Yet it's a small, single-engine jet—cheaper to build, operate, maintain.



are being used to build for the defense of all

It gives our allies *one* plane that will meet *any* situation for the next 10 to 15 years. It also gives them the advantages of interchangeable parts, planes, even pilots—and of worldwide production.

By the mid-Sixties, the Free World will have nearly *two thousand* F-104s in service.

LOCKHEED CALIFORNIA COMPANY

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quent intervals and have probably never had the self-satisfaction of having completed a single job.

It is quite understandable how these mass movements come about. The rapid growth of new organizations such as NASA, Aerospace, and MITRE requires the shifting of research-and-development personnel from other sources, namely, government, industry, and universities.

We can probably predict now that the accelerated growth of NASA from its present annual budget of about $1 billion to an annual budget several times greater within the next few years will result in abrupt shifts of technical personnel to the space agency. A large percentage of these personnel will probably come from the missile industry as well as from universities and other government agencies.

The Triple-Threat Professor

The university professor today who is well established as an authority in his field spends most of his time on individual research, as a consultant to industry, and as a member of many government committees. The triple-threat character of the science and engineering university professor dilutes his capability to satisfy the tremendous demands for education in training scientists and engineers. There have been many questions raised recently as to whether or not the quality of instruction can be maintained. According to the US Office of Education, the total college enrollments will nearly double during the 1960s, but faculties, including scientists and engineers, will rise only about fifty percent.

If in some way we could persuade our more competent professors to initiate a back-to-teaching movement, this situation could be somewhat alleviated.

Furthermore, colleges appear to be losing out in the competition for trained personnel. Increasingly, colleges are filling vacancies with men who do not have doctorates. From 1953 to 1960, the proportion of newly appointed college teachers in the physical sciences who had doctorates declined from fifty-three percent to forty-seven percent. During the same period, the number of Ph.D.s rose from 5,462 to 6,600. More and more of the new crop of sciences Ph.D.s go to industry either directly upon graduation or after a few years as a research professor. They can hardly be blamed since a good Ph.D. usually receives a starting salary equal to or greater than a university professor's annual stipend.

The Lost Half

Since Dr. James B. Conant became involved in the studies of educating young people, we have learned of "the lost half." This reference is made to the individual who is qualified to go to college but who doesn't. We must find ways to give higher education to all young people who could profit by it.

In particular, we should encourage the gifted individual to continue toward the highest degree obtainable in his field, usually the doctorate. Considering that only one gifted person out of five at the genius level attains a doctorate degree, it is apparent that we are a long way off from the proper utilization of our resources.

Educators throughout the country should prepare themselves for the tremendous challenge of the future and the trends that are becoming more and more apparent. We are beginning to find ways to educate our young talented people and also to reeducate experienced military, industrial, and university personnel who are capable of absorbing additional education. Some say that the amount of information in the world doubles every four years, and as a result even the experts have difficulties in keeping up with their fields.

Within the Air Force a vigorous program has been established to train officers for science and engineering careers within the service. In 1957 there were more than 400 officers who received graduate training in science and engineering. We expect the number to increase to 1,000 per year during 1961.

I am sure that we all agree that science and technology have had a definite impact on education. The problems of numerical strength and quality are well defined and also well understood. However, we have yet to take the first big step toward the eventual solution of our scientific and engineering manpower problems. To make any real progress we must make teaching a well paid and respected profession.—END

Dr. Sheingold, Chief Scientist of the US Air Force since April 1961, is on leave from his post as director of the Applied Research Laboratory of Sylvania Electronic Systems. A native of Boston, he holds advanced degrees in applied physics and electrical engineering. He has held a number of defense science governmental posts, and is a member of the Air Force's Scientific Advisory Board.

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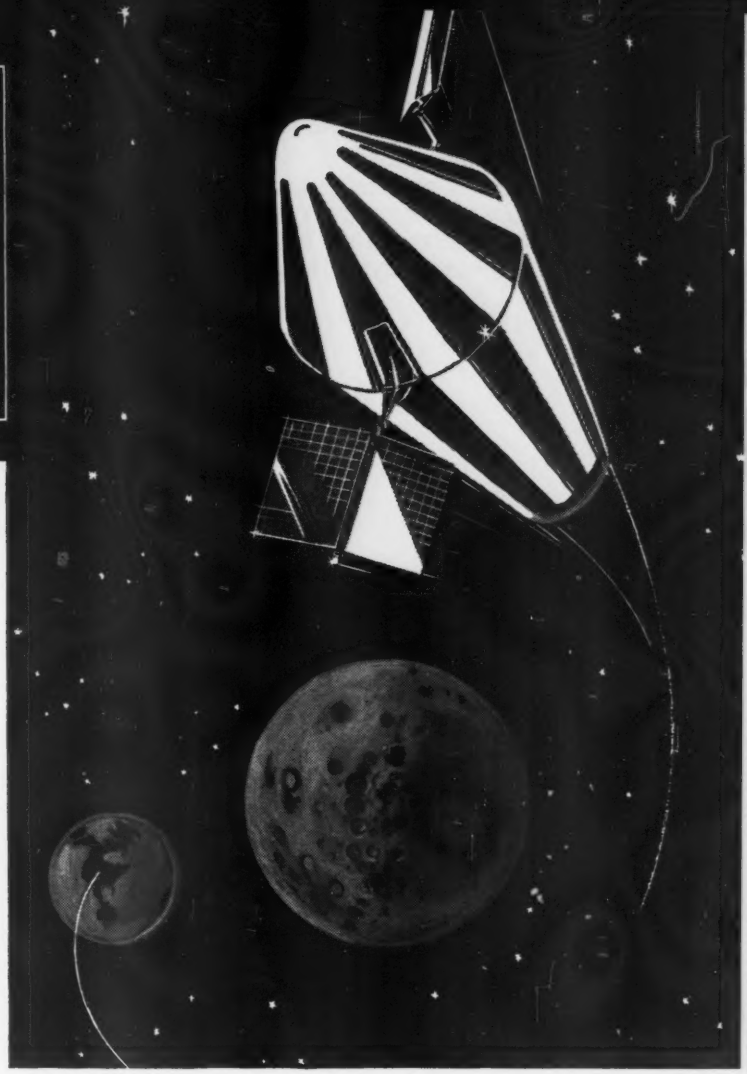

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Over the years, as Beech Aircraft Corporation has constantly developed its capabilities in the fields of design, development, fabrication and testing, it has acquired equipment, skills and experience that has enabled Beech to make invaluable contributions to the solution of many challenging problems related to the missile and aerospace age.

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Manager—Contract Administration
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MARTIN NUCLEAR ROCKET PROGRAM

- REACTOR DESIGN
- PROPULSION REACTOR START-UP
- NUCLEAR ROCKET SAFETY ANALYSIS
- RADIATION EFFECTS ON ROCKET SYSTEM
- FUEL ELEMENT DEVELOPMENT
- VEHICLE DESIGN
- CRYOGENICS

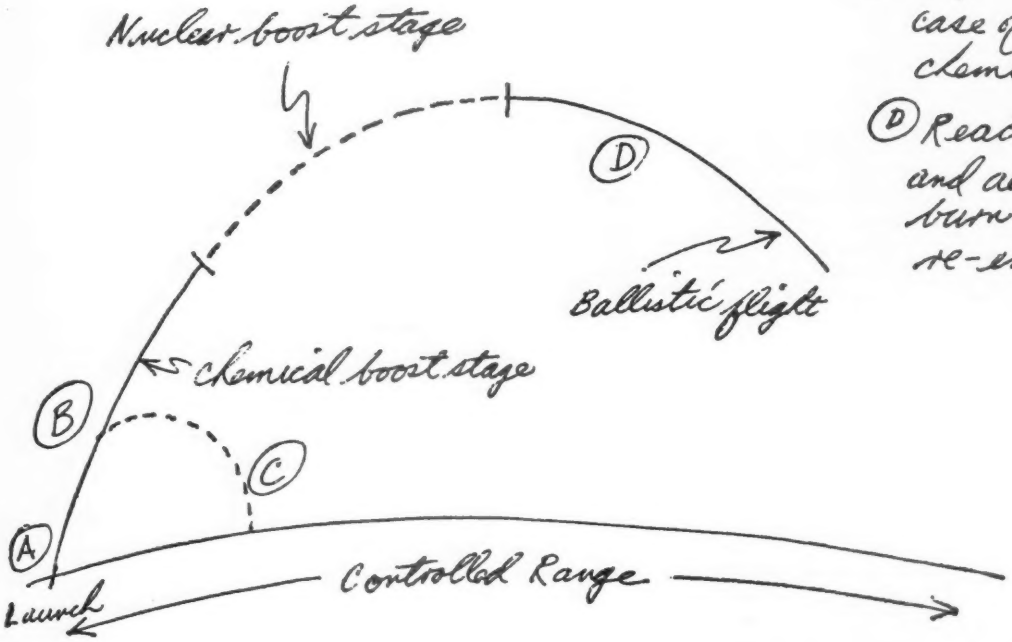
Safety Requirements

(A) Safe disposition of reactor in case of launch pad abort

(B) Rapid reactor start-up without risk of a nuclear excursion

(C) Safe disposition in case of abort during chemical boost

(D) Reactor fragmentation and aerodynamic burn-up during re-entry



SAFETY ASPECTS OF NUCLEAR ROCKET FLIGHT TESTING

Safety is one of the many areas receiving continuous attention in the U. S. nuclear rocket program. Tests must be conducted to obtain data, to develop safety systems, and to demonstrate safety.

During the past several years, Martin has gained valuable experience in the safety field through its investigations and tests concerning the use of radioisotope-fueled generators for auxiliary power in space. Analytical investigations of nuclear rocket safety conducted by the company under the RIFT (Reactor in Flight Test) program for the National Aeronautics and Space Administration are being continued. The U. S. Atomic Energy Commission's SNAP program, under which The Martin Company developed the radioisotope-fueled generator that powers two radio transmitters in a Transit satellite, involved exhaustive safety studies and tests. This was the first use of atomic energy in a space vehicle. Experience in computer analysis of booster behavior, flight test of large boosters (VIKING, VANGUARD, TITAN and PERSHING) at Cape Canaveral, re-entry, system integration, missile test range control and rocket destruct systems, as well as extensive experience in nuclear technology, has been invaluable in the development of technical capabilities and facilities required for these investigations.

MARTIN

Speaking of SPACE

WILLIAM LEAVITT
Associate Editor, SPACE DIGEST

A Letter from Muskegon Heights

A constant delight in our office is the flood of letters received from youngsters across the country asking for information on aerospace. Most such inquiries are quite broad in scope, that is, the correspondents want sent to them "everything about airplanes and rocketships." But the youngsters can be quite specific on occasion, as is Mr. Tom Brooks, an eighth-grade student at Muskegon Heights Junior High School, Muskegon Heights, Mich., who asks: "What I want to know is: Could I own the moon or some other planet? If so, how?"

We did our best to answer young Tom's inquiry, explaining that his question is indeed very complicated and one that lawyers all over the world are discussing right now, not so much in terms of whether one person can claim a celestial body, but in terms of whether nations can lay claim to other worlds by right of discovery or occupation, as nations did during the great age of discovery in the sixteenth century. We wrote that the majority of "space lawyers" hoped that international agreements could be reached whereby space and what's in it would be considered not subject to national claims but rather the common property of all mankind, as the high seas beyond territorial waters. We were indebted to a colleague who suggested that we add in our letter to Mr. Brooks the caveat that if intelligent beings occupy worlds on which we might land, they might reasonably be expected to consider their worlds their own.

Mr. Brooks's inquiry was a serious one, and it is heartening to note that this country—despite predictable Soviet obstructionism—is again calling for establishment of United Nations policy on space.

In a recent speech in St. Louis, Harlan Cleveland, Assistant Secretary of State for International Organization Affairs, said the US would press in the UN for: international acceptance of the principle that the UN charter applies to space exploration; an international system of registering objects launched into space; a space unit within the UN Secretariat; an international meteorological system using satellites; international cooperation in research leading to weather control; a global communications system, using all media; and a declaration that space and celestial bodies cannot be subject to national sovereignty claims.

Necessarily these proposals are somewhat generalized, but they should serve as an honest statement, following up President Kennedy's September 25 plea to the UN for peaceful activities in space, of our country's basic philosophy and continued hope. It is doubtful, of course, that the UN beset with earthly strife and stifled by Soviet intransigence, will take any real action along the lines suggested by the US. The permanent UN committee of twenty-four members set up to study peaceful uses of space has been moribund since its establishment in 1959.

But, on the American side, there is more than piety involved in declarations such as those by the President and Mr. Cleveland. On very high levels, for example, examinations are being made at this moment of the question of space sovereignty. This is a key question. It transcends the matter of how high is up and how high "up" can be subjected to sovereignty similar to the existing control over airspace. It is significant, too, in the light of the stronger stress developing in the Administration on possible military uses of space in the interest of American and free-world defense (*see Editorial on pages 8 and 9*).

"Where does space begin?" is, of course, the starting point, since American policy can be expected to assert that jurisdiction upward has to end somewhere. But beyond that are such practical questions as: What principles can be established in connection with the outward paths of vehicles and—vitally—the return paths. For example, will a Dyna-Soar-type space glider, homing

in on a preselected landing site, need "flyover" permission from countries it will pass en route home to US soil? Would it be a legal target for superaltitude "ack-ack"? Now, hopefully, would be the time for establishment of internationally accepted law to answer such questions.

There is an understandable conservatism on the part of some examining these questions in the government. Some feel that pressing too hard and too fast for an international policy now, assuming agreement could be reached, might limit American defensive and research capabilities later on. The furor over Project West Ford, the recent attempt to orbit for communications purposes a ring of miniscule metallic dipoles, is a case in point, although not strictly concerned with sovereignty per se. Scientists East and West complained bitterly that the US was cluttering space and obscuring views of the universe. Soviet scientists, not one of whom has ever complained about fallout hazards, were loud in their protests.

Despite the incredible complexity of the general problem, the improbability of international agreement, the various shades of opinion within the Administration and the legal community, there is hope in the fact that serious attention is being given these astronautical questions. On what eventually is adopted as national policy may well depend the safety of the US in the critical dawn of the space age.

Planning for People

Gen. Frederic H. Smith, Jr., Air Force Vice Chief of Staff, had some significant things to say on the problems of educating Air Force personnel for the space age at the recent Air Force Association Convention in Philadelphia. General Smith told an audience of educators that despite what he called the "nearly blind emphasis our age puts on automation" the Air Force's primary interest will always be in *people*. With the increasing complexity of weapon systems, the Vice Chief of Staff said, the Air Force's personnel procurement objective is an all-volunteer Air Force "dedicated to serving the nation" and "qualified for leadership."

"The people we need are people . . . capable of managing, operating, and maintaining today's weapons. But we also need people who have the growth capability to progress to the new and far more complex systems coming along in the future," he said.

He listed these specific Air Force educational objectives: (1) All officers with baccalaureate degrees in a field of study related to career field, with an academic major on which graduate study can be based; (2) greater emphasis on technical and scientific backgrounds, but also a sound foundation in the social sciences and humanities, including proficiency in at least one foreign language.

For airmen, the Air Force will want at least a high-school education.

The General reported that the Air Force has established at Air University, Maxwell AFB, Ala., an Educational Requirements Board to examine current and long-range educational needs. This Board, aided by civilian consultants and panels representing top people in various specialties from various Air Force commands, predicts that if present trends continue, the Air Force will be short some 6,000 officers with appropriate college degrees in 1971. "Right now, we are short over 10,000 officers in these [specialized] fields," the General said.

Why such shortages? The main reason is, he said, that the more complicated new weapon systems "simply require more scientific and technique types."

To answer such problems, the Board is rethinking and rewriting job descriptions, to see what kind of people and how many will be needed, so that Air Force educational planners can design in-house Air Force curricula to meet needs, and to ensure that when Air Force personnel attend civilian institutions, their courses planning can be guided to meet specific training targets.

The Board is developing, the General reported, a glossary of educational terms, to facilitate its own work, and the glossary, in turn, is providing a basis on which to plan the training to meet new definitions. When you know what an "astronautical engineer" is, then you can design the educational regimen for such a specialty.

At the same time the specialization training is emphasized, the well-roundedness must be encouraged too, and this is where the civilian educators can help, General Smith pointed out:

"[Air Force people] will function most of their professional lives as specialists. Yet they will need knowledge and awareness of foreign relations to call upon when they are needed. It will be basically the educators' job to give our future officer the raw material for this job, to give him the motivation to develop along these lines mostly on his own. We can do much to help in our professional schools. But the major part of the burden will be the educators."

ADVENT

...another major satellite that will be launched by America's "space truck," the Agena B...built by the Lockheed Missiles & Space Company, which has successfully orbited more satellites than any other builder in the world.

LOCKHEED MISSILES & SPACE COMPANY

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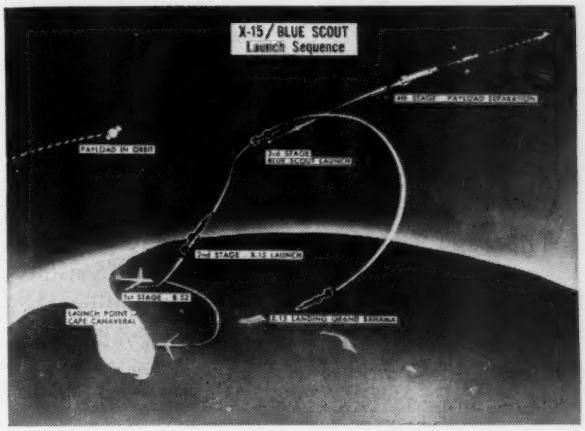


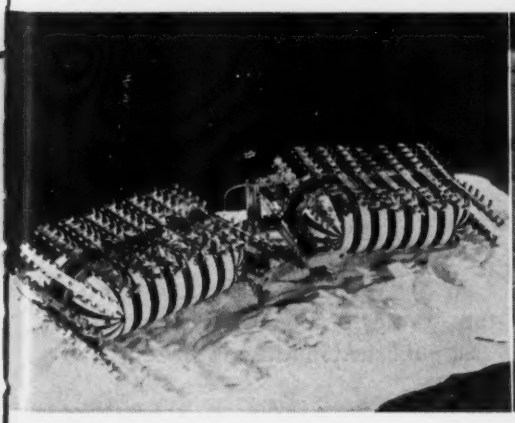
Ford Motor's Aeronutronic Division and North American Aviation propose using the X-15 as a recoverable space-booster system for orbital or space-probe missions of the Blue Scout solid-fueled rocket. X-15, borne aloft (see diagram above) to 50,000 feet, would climb on rocket power to 156,000 feet, launch its Blue Scout (right), then reenter and land. Activity is projected from Cape Canaveral complex. B-52 would return to Patrick AFB, X-15 to Grand Bahama.

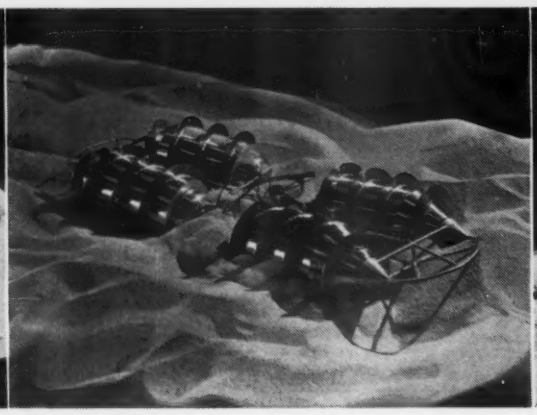
Space Capsules

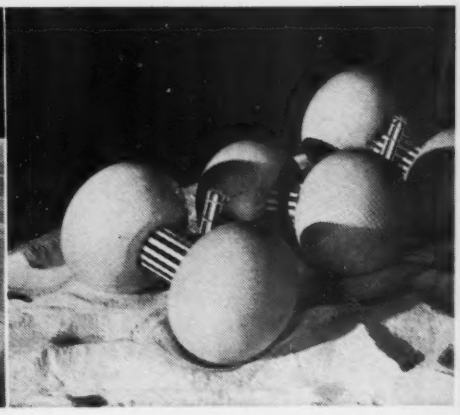
"We have four amazingly diverse opinions concerning the surface of the planet Venus—a carboniferous swamp, a windswept desert, an oil field, and an ocean. On our future manned missions to this planet, we hardly know whether to send a paleobotanist, a minerologist, a petroleum geologist, or a deep-sea diver." This comment by the University of California's Dr. Carl Sagan is from the Proceedings of the Ninth Lunar and Planetary Exploration Colloquium, held at North American Aviation's Downey, Calif., facility late last year and now in published form. Write to Dr. E. R. van Driest, Space Sciences Laboratory, Space and Information Systems Division, North American Aviation, Inc., 12214 Lakewood Boulevard, Downey, Calif., for information on availability.

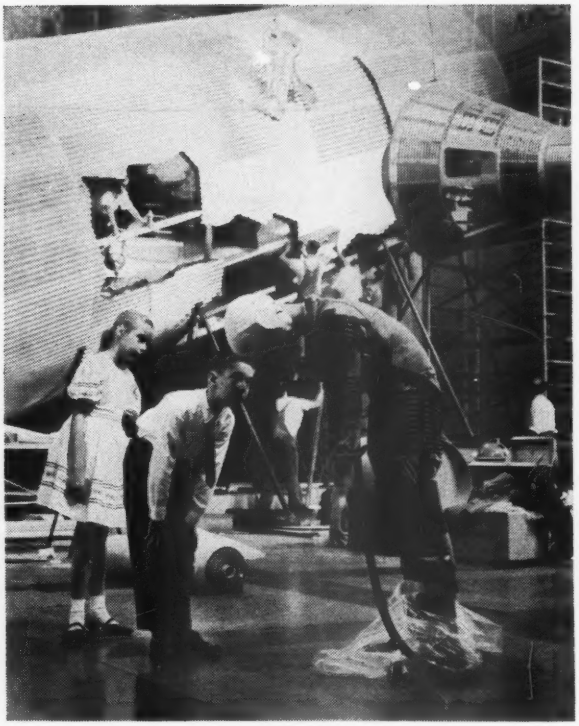
Two noted Soviet scientists, Yuri S. Pobedonostsev and K. P. Stanyukovich, suggest in an article on the US Vanguard rocket in a publication entitled *Some Problems of Mechanics,* that Soviet engineers, using a 4,000-kilogram (8,800-pound), three-stage rocket with a ten-kilogram (twenty-two pound) payload, would have achieved the same results for which the Americans needed a starting weight of 9,100 kilograms (20,020 pounds)—a startling commentary on oversophis-

General Motors Defense Systems Division's Santa Barbara, Calif., laboratories are studying possible vehicular mobility problems on the lunar surface which many experts think may be sand-dunelike. Left, the "caterpillar" concept which carries its own "road," a track revolving around the vehicle body; center, an electrically driven screw; and, at the right, a vehicle with large, doughnut-shaped wheels which might eventually rove the moon.









Now on display at New York's American Museum of Natural History is Martin Company-sponsored ARIES Man-in-Space exhibit, showing five dummy Astronauts living and working in a forty-one-foot model space lab. These two youngsters previewed the exhibit.

tication and underperformance if the Soviet calculations are to be accepted.

The October 1961 issue of the *Bulletin of the Atomic Scientists* is devoted to science and public affairs and contains, among other items, an article by Lloyd Fallers strongly taking to task Sir Charles P. Snow for what Mr. Fallers calls Sir Charles's oversimplifications in his description of the "two cultures"—scientists and humanists—who he believes have lost contact with each other to the detriment of mankind. Mr. Fallers also criticizes Sir Charles for what he considers an overemphasis on the advantages of technological planning a la Soviet Union or Red China. It is a provocative piece.

"Sleep in the guest room if you must worry so much about the missile gap!"

"The Path to Space," a twenty-eight-and-a-half-minute documentary on the US Mercury Astronaut program, edited from National Broadcasting Company and official film coverage of various aspects of the Mercury program, including the flight of Cmdr. Alan B. Shepard, Jr., is available to educational and community organizations from the Gulf Oil Public Relations Department, Gulf Building, Pittsburgh 30, Pa., or Association Films, Inc., 347 Madison Ave., New York 17, N. Y.

The National Science Fair-International, featuring youth science exhibits from across the country, will be held in Seattle, Wash., May 2-5, concurrent with the Seattle World's Fair.

Whither women in science? The National Science Foundation, in a recent report, suggests that many women shun careers in science because of a national feeling that scientific endeavors are traditionally the province of males. Despite the increasing proportion of women to men in the general population, women amount to only about four percent of all scientists and engineers in government employ. The report also pointed out that women's mental abilities "are now generally recognized to be inherently no less than those of men." AIR FORCE/SPACE DIGEST readers will recall Dr. Margaret Mead's warning (*see "The Newest Battle of the Sexes,"* SPACE DIGEST, *July, 1960*) that, unless women take an active role in the advancement of the space age, there will be no space age, because women will oppose it.

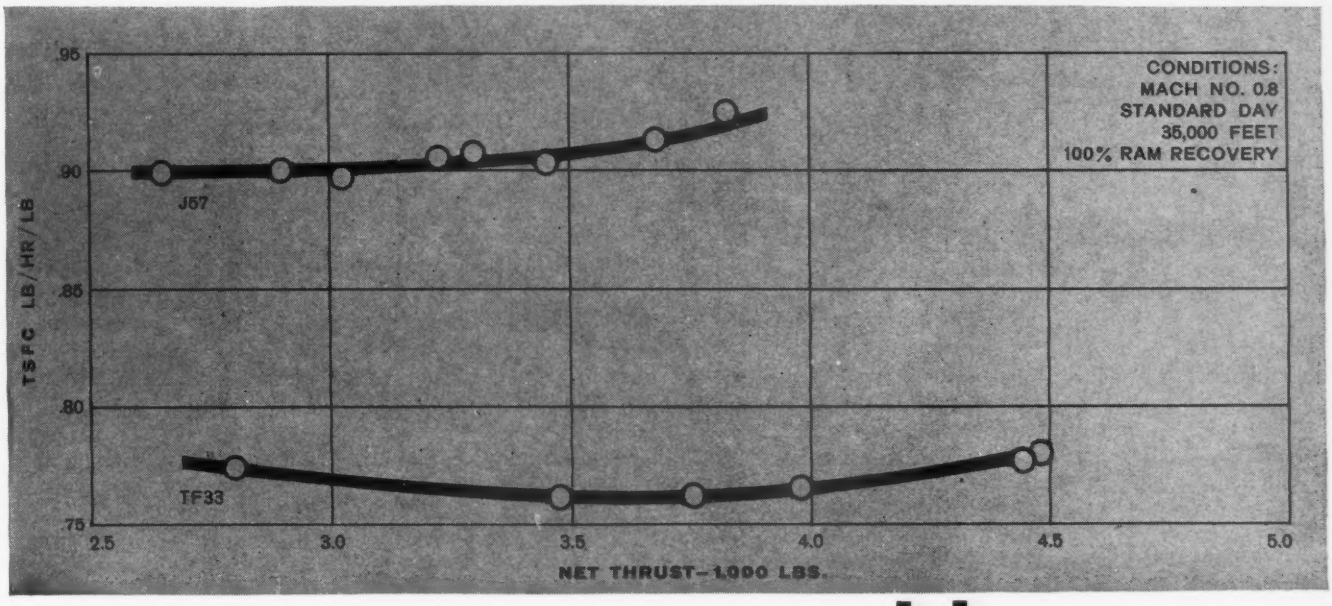
Was the moon once an independent planet? The Bulgarian astronomer Nikolay Bonev, of Sofia University, suggests that it was and that it traveled in an orbit close to the earth's. He believes that violent volcanic activity on the moon caused such great ejections of lava and rock that the postulated planet was displaced by reaction force from its orbit and was captured by the earth as it entered the earth's area of gravitational predominance. He theorizes: (1) that the moon is too large to be a natural satellite, that earth-moon, planet-satellite, mass-to-mass ratio is not seen elsewhere; and (2) that the ratio of the time of revolution of the moon around the earth to the time of the earth's rotation on its axis differs greatly from any other known comparable situation. Professor Bonev's theory is discussed in *Nedelya,* published in Moscow in September.—END

TF33

cuts TSFC 15%—cuts fuel costs 20%

Compared with the conventional turbojet, the Pratt & Whitney Aircraft TF33 turbofan engine has demonstrated a saving of over 15 per cent in specific fuel consumption at comparable cruise thrust. (See chart below.) The effect on operating expense is obvious—less fuel, lower costs. Furthermore, the turbofan's fuel economy is paired with a 22 to 26 per cent lower specific weight than conventional turbojet engines operating today. As a result, the Pratt & Whitney Aircraft TF33 makes possible increased payload, and more than 20 per cent greater range.

ALTITUDE PERFORMANCE COMPARISON OF J57 TURBOJET AND TF33 TURBOFAN



PRATT & WHITNEY AIRCRAFT DIVISION OF UNITED AIRCRAFT CORPORATION

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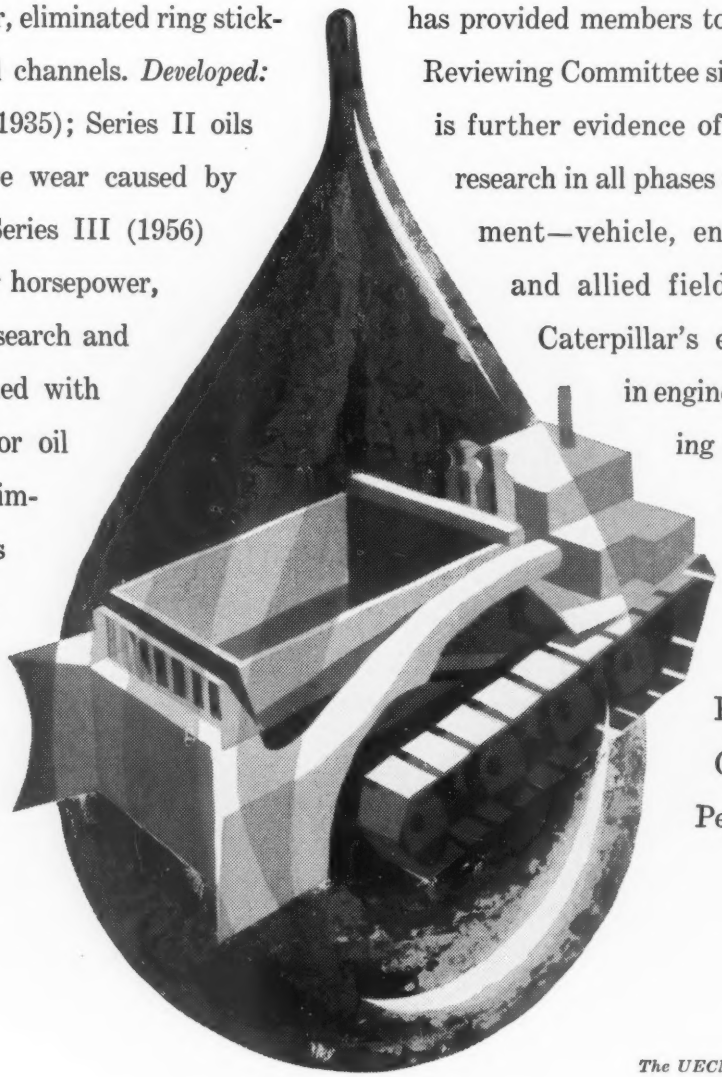

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WASHINGTON, D. C. PEORIA, ILLINOIS

RESEARCH • DEVELOPMENT • MANUFACTURING FOR DEFENSE

AIR FORCE
DECEMBER 1961

The North Atlantic Treaty Organization, writes a Belgian-American scholar, must strike out on a new path to achieve its potential as bulwark of the free world. Noting that "truth can be paradoxical," he proposes a pattern for the Atlantic Alliance characterized by "unity through diversity," "national sovereignty to advance collective security," and a partial "disengagement" among the Western Allies aimed at "stricter and more exacting engagements" . . .

NATO must be born again

By Paul L. Peeters

WE HAVE, in the recent past, heard a great deal of debate on the character of NATO armed strength.

- Should NATO have its own strategic nuclear striking force?
- Should the alliance undergo a determined buildup of nonnuclear conventional capability?
- Should nuclear weapons be at the ready for tactical battlefield use in the event of attack?
- Should we set up a neutralized zone of "disengagement" between Western and Communist forces in Europe?

One learned commentator a few years ago suggested that Western European nations turn their attention primarily to creation of guerrilla warfare capabilities to come into play should Russia overrun the continent of Europe. And, some time past, a retired British general called for both the United States and Russia to withdraw their forces from Europe.

The fact is, all of the courses of action suggested above are inadequate. They do not start from the fact that NATO *itself* must change. If we want to make NATO stronger, we must create a new NATO, new not only in hardware or in strategic doctrine, but new at its very heart.

What we have sought in NATO previously has been unity, more unity, and still more unity. We have not been wholly successful nor wholly unsuccessful, but the effort has been the same every moment. Unity was good, disunity evil. The allies have all tried, more or less, to be good.

But NATO can get along with a good deal of disunity. Or, to put it in perhaps a better way, the key to a strong NATO, growing stronger all the time, may well be a kind of interallied *disengagement*. There is no need for us to huddle together like sheep. We must be allies. We must cooperate fully. We must understand and help each other in a variety of ways, the most urgent of which now as in the past may be military. But, at the same time, there would be a superb new quality of strength for the West in an alliance whose members followed their own courses of action in a number of areas. The great and noble aim should be an alliance of strong partners acting in harmony. What we do not want is a group of dispirited, weak nations clinging for life to what most of them consider a "better-than-nothing" sort of disunited unity, with one or two strong partners self-consciously calling the tune. But, one fears, this is the situation we are moving toward, if not in already.

A policy of interallied disengagement would, of course, be contrary to our present theories of collective security. At first, this may seem a wild, rather far-out formula, albeit with a certain amount of idealistic appeal for peoples bred on concepts of freedom, independence, and individualism. But it is really far more than that. It would be a practical working philosophy for a strong NATO now and in the years to come. It would not call for radical departures putting an end to much that is good in NATO; it would,

(Continued on following page)

rather, build a strong and lasting alliance on the foundations in place at present.

Let us look, then, at NATO as it stands and as it has grown—an alliance that has existed from the start in a state of internal and external crisis, an alliance today taut under the pressure of growing Communist strength.

The formative years of NATO stretched from the formulation of the policy of containment in 1947 to the US presidential elections of 1952—a period of great accomplishment and a time of sentimentality. During that period we helped Europe get back on its feet. We wanted Europe to be itself again. We also wanted Europe to be *different* from what it had been. The centuries-old walls of European nationalism, we felt, had to be torn down. European unity was identified with the preservation of Europe.

The economic power and the atomic bombs of the United States were then considered worthy of passive confidence. Allied unity was of necessity, not of choice. This was integration, but integration by European default.

Today, the facts of European defense are only too evident. The US nuclear monopoly is long gone. Only one of our European allies possesses its own strategic deterrent. On the other hand, the most solemn declarations do not seem to convince the European nations that their defense can be fully and completely entrusted to American leadership. Our allies quite legitimately ask themselves whether the American commitment to defend NATO is strong enough to compel the United States to risk nuclear destruction to help its allies.

At this point, three formulas suggest themselves:

- Some of our strategists first reason that, if the American deterrent is not credible to the Europeans, they should assign high priorities to defense of their homelands. Homeland defense in this case would mean land defense, that is, a nonnuclear, purely conventional defense. Europe should, it is reasoned, "seriously" take up the "old-fashioned" and "unpopular" assignment of raising land armies by conscription or otherwise.

No responsible European statesman would deny that an increase in NATO's conventional power is desirable. He would agree that this responsibility falls primarily upon the Western European people. But he would then seek to unmask the fatal illogic of our insistent, paternalistic argument on this score.

If the United States insists that the defense of Europe must be primarily based on a conventional buildup, the European might say, Europe must conclude that American strategic forces will be used only to deter direct attacks upon the United States. Europe fears that an increase in European conventional power will *not* increase the United States's willingness to risk destruction for the defense of Europe. And these fears will be greatly increased, of course, if the United States insists that it would never strike first. If a stronger shield means a longer "pause," it also means that the United States is less prepared to react to Soviet aggression in Europe *before* Europe is destroyed.

And, further, Europeans judge it *not* credible that the Soviets would refrain from using *their* nuclear weapons against "old-fashioned" conventional systems, particularly if NATO's conventional counterforces are effective against Soviet offensive forces. Under the circumstances, it is said, the choice between using or withholding nuclear weapons is no longer up to the allies, and to concentrate exclusively on a conventional buildup in Europe would be to court disaster.

Nor can it be argued, this line of thought continues, that the Soviets would hesitate to use their nuclear weapons because nuclear warfare would devastate the battlefield. For Germany is likely to be the battlefield. The USSR would devastate Germany with zest.

- Now, a second formula: Since words and legal commitments cannot be fully trusted, all the allied countries should be forced into an arrangement that would compel them to fight or perish together. Substantial American manpower would be kept in Europe as NATO's willing hostage. European countries would have, under national control, small but effective strategic forces to trigger, if necessary, the fateful nuclear exchange between the United States and the Soviet Union by "catalytic" effect.

But, one must observe, it would be very foolish indeed to expect anything from an alliance achieved at gunpoint and operating by tragic compulsion for the benefit of the weak at the expense of the strong. It is vain to expect that the United States would ever allow itself to be forced into war against its enlightened will. It is even more unreasonable to expect that any European country would unleash a thermonuclear war alone and without any secure guarantee that the United States would follow suit. Surely, the hypothesis of a catalytic war has to be coolly examined, just as the hypothesis of an accidental war, but only to devise the means to protect ourselves against the risk of automatic entanglement.

Also, it should be stressed that, if NATO stakes its future on the catalytic effect, NATO can settle for nothing short of complete political integration. This would mean, of course, the surrender to the United States of all national sovereignty. From the European standpoint, the catalytic formula is, therefore, impracticable and self-defeating.

- The third alternative is interallied disengagement, of which we have spoken above.

Before explaining what a policy of such mutual disengagement entails, let us first understand what it is *not*.

Interallied disengagement does *not* imply that Western Europe or any European country individually should become an independent Third Force and achieve strategic self-sufficiency, although this policy would, among other things, encourage development of independent strategic capabilities. An allied country that decided to acquire independent strategic power would continue to include the American deterrent in its own strategic equation. It would assume that the USSR is already deterred by the United States. It would take for granted that the American deterrent satisfies the *collective* needs of the alliance. Yet there is one need that is not met. It is a national or *individual* need, and not a collective one. The allied country would want to achieve an independent or *qualitative* posture of deterrence *within* the global strategic system of the West.

This qualitative posture is achieved if the allied country is in a position to deter a direct attack upon itself. This means that a small country that can inflict limited damage upon the USSR achieves effective deterrence with limited strategic forces.

Disengagement and collective deterrence are not incompatible. Mutual security and strategic independence *seem* incompatible because we are so used to thinking in these terms.

We also assume, out of habit, that the United States cannot support a policy of interallied disengagement. At present, if an allied country decides to build its own strategic forces, it does so without our cooperation. If France wants to be independent, we say, let it be. But France will then have to be independent in research, procurement of strategic weapons, and expenditures as well as in the operational use of its own striking forces.

This negative view of disengagement postulates that strategic independence is detrimental to our interests. But, if

it could be shown that disengagement is beneficial to the West, the United States would presumably lend its active support to an ally that sought to build its own deterrent.

It is frequently asserted that independent control of nuclear weapons prevents the formulation of a common NATO strategy. The troubles of the West are simply explained by the allies' failure to unite. Alliances work by "mutual agreement on mutual interests," and, putting the cart before the horse, we dogmatically conclude that the remedy to the lack of unity is more unity. Greater allied unity is desirable, of course, but the problem is *how* to achieve unity. And we must face up to the idea that disengagement is not necessarily the opposite of unity—only to lip service about unity.

The unity argument is given added strength when it is said that the USSR seeks the breakup of NATO and that the best way to frustrate this Soviet policy is to unite more and more. But the Soviet rulers are master Machiavellians. They want the breakup of NATO, naturally, and they also believe that this objective is not openly realizable. Consequently, they use NATO as an asset, as a way to encourage divisiveness by fencing the allies into a system that promotes the festering proliferation of their mutual caprices, fears, and ambitions. It is not that the Soviet rulers welcome any effective allied unity—be it lasting or temporary—but they are convinced that *by aiming too high NATO will miss the mark.* From their standpoint, it is better to encourage a feared Western policy if this policy appears likely to fail. The Kremlin believes that NATO as it stands is not likely to achieve decisive success.

Let us finally emphasize that a policy of relative interallied disengagement should not be identified with free, uncontrolled nuclear dissemination. Our present policy on the sharing of nuclear information is based on two contradictory premises. It is assumed first that no great skill is required to produce atomic weapons, that the days of nuclear plenty are at hand, and that every industrially advanced country is anxious to join the atomic club. Second, we assume that nuclear dissemination can be controlled by sitting tight on our "secrets" and by reserving our cooperation to those countries which have already accomplished "substantial progress" in the making of nuclear weapons.

Our sullen hostility to nuclear dissemination only serves to increase the ill-feeling and the frustration experienced by some of our allies. And as Edward Teller has noted, "We could prevent the uncontrolled spread of nuclear arms by replacing it with a controlled sharing of our knowledge and nuclear resources." But it is not necessary to postulate, as Dr. Teller does, that this sharing should "make the establishment of common institutions and common loyalties both necessary and possible." If nuclear sharing is made dependent upon the establishment of what he calls a "single supranational government," it is safe to conclude that there will be no nuclear sharing, no controlled nuclear growth. In contradistinction nuclear sharing *can* be offered under conditions that would induce the allies to *seek* American cooperation, to submit to stipulations and to rules that would be accepted for the common good.

At this point we turn to a positive examination of the concept of interallied disengagement.

In a recent book, the British analyst Alastair Buchan notes that "it is the breadth and diversity of Western contacts with the rest of the world which gives the Atlantic Community much of its moral and political strength." In the nonmilitary sector of the cold war—the battle of the minds—this great reality of Western diversity must be taken as a starting point and treated as a paramount asset which we want to preserve. The single and effective system we want to establish for the defense of the free world must be diversified, must deal in complexity, must have many parts if it is to make full, intelligent use of its resources.

For example: If France had not waged a losing battle in Indochina for eight years, Indochina might be *totally* lost today. We should understand the usefulness of such broadly distasteful rear-guard actions, particularly if we are relieved by circumstances of the unpleasant responsibility of having to wage such actions.

On the other hand, our anticolonialist tradition allows us to win the friends that France might have lost, and France should understand that our anticolonialism benefits the true French interests by indirection.

A neutralist country can be violently anti-American, and lend itself to economic penetration by West Germany.

Africa truly should belong to the Africans, but European influence in Africa is a factor of order and progress, and it should be consciously maintained.

Let us therefore resolve once and for all to remove the mental block of narrowness, of pedantry, of blind faith in "unity." Instead of expecting the allies to agree on everything, let us expect men and ideas to clash. Let us expect the allies to disagree. Let every interest, every phase of complex situations be taken care of through a wise and patient division of labor. For every situation likely to divide and to weaken the West also is a situation that is dialectical —that is, a situation that makes contradictory demands on Western policy and calls for a diversified approach.

If the cultural wealth and power of the West are to be properly shared and allocated to every need everywhere, the Western world must be *many* before it can be *one.* If American leadership is to meet the various challenges with which it is confronted, it must play many roles, speak many tongues, and be diversely channeled, even though as a whole it must sweep onward in a single direction. This selfless pliancy is possible only if we subdue our doctrinaire and unfortunate tendency to sit in judgment, to decide that colonialism is wrong and that democracy is right, to usurp the divine prerogative and attempt to make history by verbal fiat.

But how could the tasks be so divided without a measure of interallied disengagement?

The specific purpose of NATO is to deter Communist aggression in the treaty area. Deterrence must be taken seriously by all and each one of the parties. Deterrence must be active, existential. All Western countries must cooperate in making it effective; otherwise collective security is not an asset, but a dreadful liability. Now deterrence cannot be actively pursued by the NATO powers *individually* as long as they do not feel the responsibility of deterrence weighing heavy on their *own* shoulders. On the other hand, deterrence is effective only through collective effort. But the more interdependent the allies become, the more the alliance is taken as a substitute for individual effort, the more frustration it generates. NATO, deliberately promoting a deploring process in order to restore national dignity, should take the following steps:

- **First,** the base of the alliances' strategic power must be spread, diversified, decentralized. NATO should underwrite the creation of *national* striking forces not only to control their size by mutual agreement, but also in order to ensure their operational effectiveness. Atomic stockpiles and strategic weapon systems under the joint control of one or several other countries should also be developed. Although it is neither fish nor fowl, the long-pending proposal for a deterrent under collective control could also be entertained.

(Continued on following page)

If this were done, the deterrent the West as a whole would possess would be *spread* geographically over the entire Atlantic area. There can be little doubt that the disposition of our collective power has become strategically unsound and that it will become eventually untenable. With Polaris submarines at sea, missiles and bombers, tactical and strategic power, the deterrent would be *diversified.* And it would be *decentralized* insofar as it would respond to various "nerve centers." In this respect, disengagement means that, if one country decides to withhold the strategic forces that it controls, the rest of the alliance is not bound by its decision. If one country acts in desperation or with criminal intent, it has to act alone.

- **Second,** the alliance should seek to promote active interallied diplomacy and to encourage bilateral relationships among its members, particularly between individual countries and the United States.

Strategic forces under national or dual control would be a strong incentive for effective cooperation between individual members and the United States. Other incentives can be devised.

It is a plain fact that the United States has applied, up to now, a double standard in interallied relationships. It has favored bilateralism in certain instances. As far as continental Europe is concerned, it has insisted upon acting almost exclusively through the collective agency of NATO. This practice must be discontinued.

- **Third,** the alliance should define very strictly the area of integrated defense with a view of *insulating* the tasks that can be performed only through common effort and under a single, supranational authority from those that can be achieved best through national effort and under national authority.

Air defense and early warning are tasks that transcend national boundaries, particularly in Western Europe; they require the active cooperation of all the allied countries. Other tasks are equally vital, but it matters little by whom they are performed. The guarding of Gibraltar and of the Skagerrak illustrates this particular aspect of interdependence. And the main common task is, of course, the maintenance of the "shield" in the forward area.

NATO will never pull out of its present nadir if we are satisfied with agitating the specter of war, insisting upon a more equitable distribution of the cost of common defense, asserting that nationalism must yield and be subordinated to the needs of a wider cause. A little more of the same medicine which has proved its ineffectiveness will not be of much use in the future. It is correct that the area of allied interdependence is a large one, that the decisions that the NATO countries must make to fulfill their collective obligations have implications in the various fields of national policy: taxes and foreign exchange, costs and labor policy, the public and the private sector of the economy. But it is equally certain that the need for an integrated effort in certain areas of collective security tends to overlap and to invade other areas, thus causing a stultifying effect on the common effort itself.

The tasks that must be accomplished in common must not be granted such a precedence that they finally come to appear as the rule and sole reality of NATO policy. Integration plus interdependence should be viewed as the formula available to each member country to free itself from what could be called the *menial* tasks of security and conversely to disengage national sovereignty in its *regal* aspect from the alliance's collective will.

If this program is enacted, NATO will undergo a mystic death, and be instantly reborn Phoenixlike.

This death will be mystic because *none* of NATO's present realities, forces, and programs would have to be discontinued or displaced. The only requirement is a new spirit.

But NATO has to die before being reborn. The allies must bring to the funeral pyre the dream of a superintegrated alliance, the dream of easy, absolute deterrence, also their fears, their fratricidal enmities, power politics, doctrinaire idealism. Every country has to make its offering.

NATO would rise from the fire because the NATO countries would no sooner experience again the responsibility of their own defense than they would also understand anew how much their future depends on collective security. Responsibility begets dignity. Combined with a vigorous interallied diplomacy, this renewed sense of individual dignity is the true infrastructure of NATO.

And what would this program spell for the USSR?

From the Russian standpoint, bluff and intimidation are most effective when the whole Western alliance can be collectively engaged and paralyzed by a self-imposed role of unanimity. The Indochina crisis of 1954, the Quemoy crisis of 1955, the Berlin crisis in its first phase, the Congo and the Laos crises have shown that Soviet diplomacy scores heavily when the allies operate under the illusion of allied solidarity. In contradistinction, the second Quemoy crisis and the Lebanese affair of 1958 were handled briskly and successfully because the alliance was not so engaged and because one ally could act with a free hand to meet the situation as it arose.

Who can say that the Soviet Union would not be more impressed by the virile stand taken by self-relying allies acting individually, under a common threat, for a common purpose, and with a collective power that would be intelligently divided, than it would be by a common communiqué reached after months of painful wrangling, and reflecting more mutual exasperation than united courage?

The enemy, in fact, would have to assume staggering risks and would be unable to plan his moves with the unfailing accuracy that is required in the atomic age if he were faced with diversified strategic systems, responding to the sovereign will of several countries, the reaction of which would not be predictable.

Deterrence cannot be wholly effective until each one of the allied countries freely assumes a posture of deterrence. And how can this posture be assumed if the allies are not free? How can the allies be free if they cannot defend themselves? How can they defend themselves without modern weapons, independently held?

NATO must promote unity through diversity. It must defend national sovereignty to advance collective security. It must yield to centrifugal tendencies in order to unleash centripetal forces. It must induce the allies to disengage themselves from their collective compact only to bind them by stricter and more exacting engagements. This is a paradox, but truth can be paradoxical, and not all good objectives can be pursued headlong with impatient dogmatism. Indirection is NATO's order of the day.—END

The author, Paul L. Peeters, is associate professor of economics and government at Iona College, New Rochelle, N. Y. A Belgian by birth and forty years old this month, Mr. Peeters has been an American citizen since 1952. He has written widely on strategic and military subjects, and is the author of the book, Massive Retaliation: The Policy and Its Critics.

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—Eugene M. Zuckert, Secretary of the Air Force

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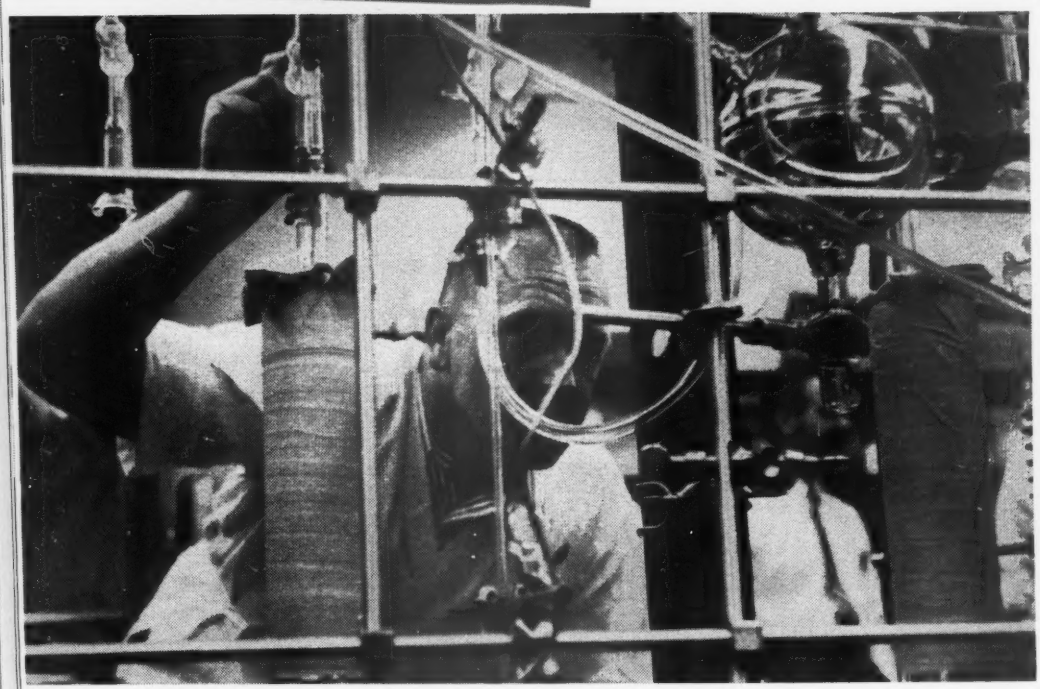
—Roswell L. Gilpatric, Deputy Secretary of Defense

The most critical resource we have is management talent.

—Gen. Bernard A. Schriever, Commander, Air Force Systems Command

The traditional prime contractor, the independent systems contractor, and the nonprofit corporation are but progressive attempts to keep forms of management abreast with technology. Each of them was created within the framework of private industry to perform a common function. The first step was to concentrate this function in a single manufacturer; the second to sever it from hardware production; the third to separate it from the profit motive.

—Max Golden, General Counsel, Department of the Air Force



In the aerospace age, top managerial skill must be tempered with true objectivity. This careful balance is the government's aim in the utilization of nonprofit organizations. It is a unique and justifiable solution for a time that demands high skill against a background of urgency . . .

'NONPROFITS'—Who's Got a Better Way?

By Claude Witze

SENIOR EDITOR, AIR FORCE MAGAZINE

CLEARLY, the spotlight is on technical management. This is true not only in the defense industry and the Pentagon, which share the staggering responsibility for America's security in the years ahead, but in Congress, where the effort is monitored.

The issue now appears joined at the point where the Defense Department, and most specifically the Air Force, believes that in special cases top technical management must be teamed with true objectivity. And that the nonprofit corporation, created specifically to provide talent and objectivity, is the best way to form this team. But some members of Congress are challenging the concept as a tool to achieve good management. And there are men among them who are the first to find fault with bad management when it appears.

At the same time it must be pointed out that no committee, congressional or otherwise, has argued that there is a better way of garnering the talent and objectivity needed or that a change would improve our management of defense projects.

It must be understood at the outset that the spotlight is on a single category of nonprofit organizations. At the moment these include the Institute for Defense

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AIR FORCE POLICY ON 'NONPROFITS'

Following is the text of the Air Force's policy statement, issued recently over the signature of Air Force Secretary Eugene M. Zuckert, on nonprofit corporations, with specific reference to Aerospace, MITRE, RAND Corp., Analytic Services, Inc., and System Development Corp.

These Air Force-sponsored nonprofit corporations have a close and continuing relationship with the Air Force that sets them apart from other organizations, profit or nonprofit. It is to this special status that our policies on relations with them must be shaped.

We look to these nonprofit corporations to focus the nation's finest scientific and technical talents on selected and highly sophisticated tasks. They must not become convenient catchalls for projects which could be performed by private industry; the élite nature of their technical staffs must be preserved. Any dilution of the select quality of these organizations can only have an adverse effect on their ability to carry out their vital Air Force work. Procedures must be developed to require them to coordinate with the Air Force before undertaking assignments from other government agencies or commercial sources.

It follows, moreover, that the business aspects of their affairs must be open to Air Force scrutiny, much as an actual Air Force operation. Frills and other nonessentials cannot be tolerated, if public confidence is to be maintained in their unique role. Such accountability is not inconsistent with the freedom of thought and independence on technical matters that we seek from these corporations.

Standards of conduct likewise merit particular emphasis. There must be no conflict between the public interests, with which these nonprofit corporations are impressed, and the private interests of their trustees, officers, members of technical staffs, and other employees. Each corporation will be expected to prescribe and enforce suitable regulations to this end. These should take advantage of the progress that certain companies have already made—as for example, in the area of trustees. This indicates disclosure by a trustee of any private interests which may be in conflict with his responsibilities, his disqualification in particular matters, and restrictions on his use of inside information.

The special position of certain of these corporations exposes them to extensive technical information of other contractors. To prevent the possibility or appearance of private advantage to these corporations, our contracting officers should proceed in accordance with the recently revised policy in Paragraph 9-107.1 of the Armed Services Procurement Regulation. This policy provides guidance on the acquisition by the government of title to inventions, in lieu of a comprehensive license of free use, where the services of the contractor are largely those of coordinating and directing the work of others.

The fees allowed these corporations must also be tailored to their special status. While the amount of the fee in a particular case is necessarily a matter of judgment, it is clear that the traditional rules covering commercial companies do not fit these nonprofit corporations, particularly when the bulk of their contracts are assigned on a sole source basis. We recognize, however, that these organizations have legitimate needs that can be met only through fee. Above all, their stability must be assured, if they are to continue as effective instruments. For this purpose, fee is a proper source of assistance to these corporations, to be applied, for example, toward the conduct of independent research programs. Such programs, which foster a healthy scientific climate, are to be encouraged, provided they are carefully planned and held within reasonable bounds. The fee may also be reserved for some working capital requirements, but should not be regarded as a substitute for advance payment arrangements, the preferable source.

Facilities, too, warrant different treatment. As a general rule the government should provide these corporations with the buildings required for the performance of their contracts. There may, however, be circumstances which justify the acquisition of facilities by these corporations with their own resources. Inordinate fees must, of course, not be allowed for this purpose; instead, consideration should be given to private financing under time-phased arrangements guaranteed, if necessary, by the Air Force. In the case of company-furnished facilities, the costs of maintenance and repair, but not depreciation, can properly be charged to Air Force contracts. Leasing of facilities by these corporations may, at times, prove to be a sound method of satisfying short-term or emergency working space needs. But these leases must have reasonable rental rates and avoid arrangements which permit the lessor to recover his investment on an accelerated basis.

As a corollary to the foregoing policies, the charter of at least one firm authorizes the Secretary of the Air Force to direct the disposal of its assets upon dissolution; and a provision to this effect is now under active consideration by the trustees of yet another corporation. The boards of the other nonprofit corporations should be asked to take similar action.

Salaries pose perhaps the most difficult problem of all. Charged with heavy and varied responsibilities, it is clear that these corporations must attract and retain talent of the highest order. Yet, their employment policies must be marked by good judgment and restraint. These companies have no license to outbid the market at every turn. If the compensation paid by these nonprofit corporations exceeds that paid by the government, it should be because private industry—with whom these companies must compete for scientific, technical, and other personnel—typically offers such higher compensation. The Air Force, on its part, must continue to review for reasonableness certain individual salaries as well as the over-all compensation structure of these corporations.

The policies outlined herein are designed to illustrate, not to exhaust, the guides that must be followed in Air Force relations with these nonprofit corporations. So far as possible, these policies should be applied uniformly to all of these corporations, for while they differ from other contractors, these nonprofit corporations have much in common. Standardization should be the rule, down to such particulars as contract clauses; exceptions must be firmly founded in fact.—END

Analysis, RAND Corporation, Aerospace Corporation, MITRE Corporation, System Development Corporation, Analytic Services, Inc., and the Army's new Research Analysis Corporation. Most recently, the Defense Department has launched the Logistics Management Institute.

Outside the Defense Department, the National Aeronautics and Space Administration is reported considering a nonprofit organization to help mobilize scientific skills. And, as if to illustrate that even profit-makers see virtue in no profit, the communications industry is considering such an organization to operate a satellite relay system in space.

Some of these organizations are concerned with matters of management, as distinguished from primary interest in research, development, test and evaluation, or the production of hardware, however small in quantity. In aerospace jargon, they are carrying out the primary mission of systems engineering and technical direction, described on these pages last month in the more familiar terms of architecture and management. Aerospace and MITRE are the most important examples.

Their ancestry goes back, as Air Force General Counsel Max Golden suggests, to the time when USAF entrusted systems engineering and technical direction to a prime contractor, monitored by a Weapon System Project Office. The B-52 bomber was produced with the Boeing Airplane Co., as prime, and when the first airplane was delivered to Castle AFB in California, the entire system, both airborne and ground-support elements, was operational. Gen. Clarence Irvine, then Deputy Chief of Staff for Materiel, said it was the first time in his experience that this had been true.

With the advent of ballistic missiles, USAF turned to a special private organization for its systems engineering and technical direction. This was Ramo-Wooldridge, later Space Technology Laboratories. Factors dictating the decision in 1954 were the status of the ICBM program, which had been allowed to lag for a few years, the size and complexity of the program, and its high priority. On top of this there was a recognized shortage of top talent capable of mastering all the new technologies that had to be coordinated to ensure success. From the beginning, Ramo-Wooldridge was a profit-seeking organization but labored under a USAF-imposed handicap: It was forbidden to turn to hardware production as a source of profit. Ramo-Wooldridge was financed for the most part by Thompson Products Co., which does manufacture missile components. The parent company, it was recognized by the Military Operations Subcommittee of the House Committee on Government Operations, "was clearly interested in Ramo-Wooldridge's commercial potential." The company was looked upon by its severest critics as "another private contractor pursuing its stockholders' interests first and the government's interest second."

Basically, it was this criticism that led to the establishment of Aerospace Corporation after the same House committee, acknowledging that the early missile program had been a success, said in 1959 that "if STL is to have any future with the Air Force, it must be converted into a nonprofit institution. . . ." USAF chose to sponsor formation of a new company, after it was clear that STL was determined to continue—as always—as a profit-making organization.

What Aerospace is to USAF's aerospace program, so is MITRE Corporation to the electronic systems in the relatively new area of command and control. As a technical adviser, it works on concepts and integration. It cannot design a product or carry on production. It provides top technical talent with objectivity. "The necessary objectivity might be attainable in industry," says MITRE president C. W. Halligan, "but as a rule industry itself might question an evaluation made by the contractor or by his competitor."

This has been confirmed by USAF's experience with systems evaluation and technical direction. The Air Force also has found that it can achieve more flexibility—in technical areas, logistics, and organization—by using an independent contractor. When several systems are being managed by one organization, the major subsystems back up each other. If one appears to be failing, it is relatively easy to select a subsystem from another project and substitute it. If one subsystem shows marked superiority over its parallel in another project, management is free to recommend its substitution. This kind of flexibility is hardly possible if each aerospace system has its evaluation conducted by a different prime contractor. It also has been pointed out that the method gives USAF more flexibility in dealing with a large number of associate contractors.

There are sound indications that over-all costs are reduced. A single prime, as Congress has lamented from time to time, can collect overhead and profit on work done by subcontractors. At the same time, some studies indicate, the method generates greater competition among would-be associate contractors.

It has been pointed out that a profit-making company entrusted with responsibility for system evaluation and technical direction is bound to face situations where it can make an honest and objective decision and still be accused of serving its own, and profit-making, interests. If, under these circumstances, the prime contractor loses the confidence of some associates, his value to USAF is lessened and the projects he handles are jeopardized. This goes not only for current systems but also for the ones he may direct in the future.

As pointed out last month, more than 350 nonprofit organizations are serving the government. If any two of them are exactly alike in charter, corporate structure, environment, mission, capability, or future prospects and ambition, it is not evident in the record. What they do have in common is their utilization in what Deputy Defense Secretary Roswell L. Gilpatric has called "a variety of functions."

"Most of us in the Department," he said in a recent speech, "rarely have the time to sit back and examine objectively the operations of the military establishment. While individuals could be detached from their regular assignments for this purpose, such an arrange-

(Continued on page 83)

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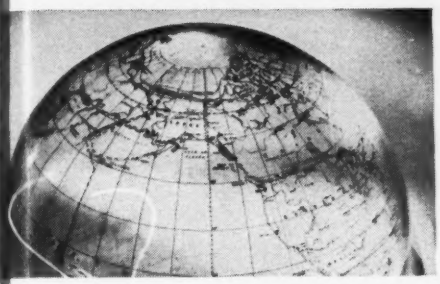

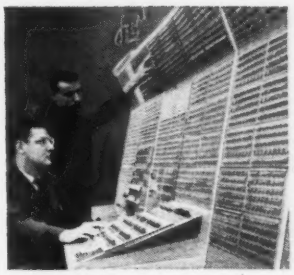

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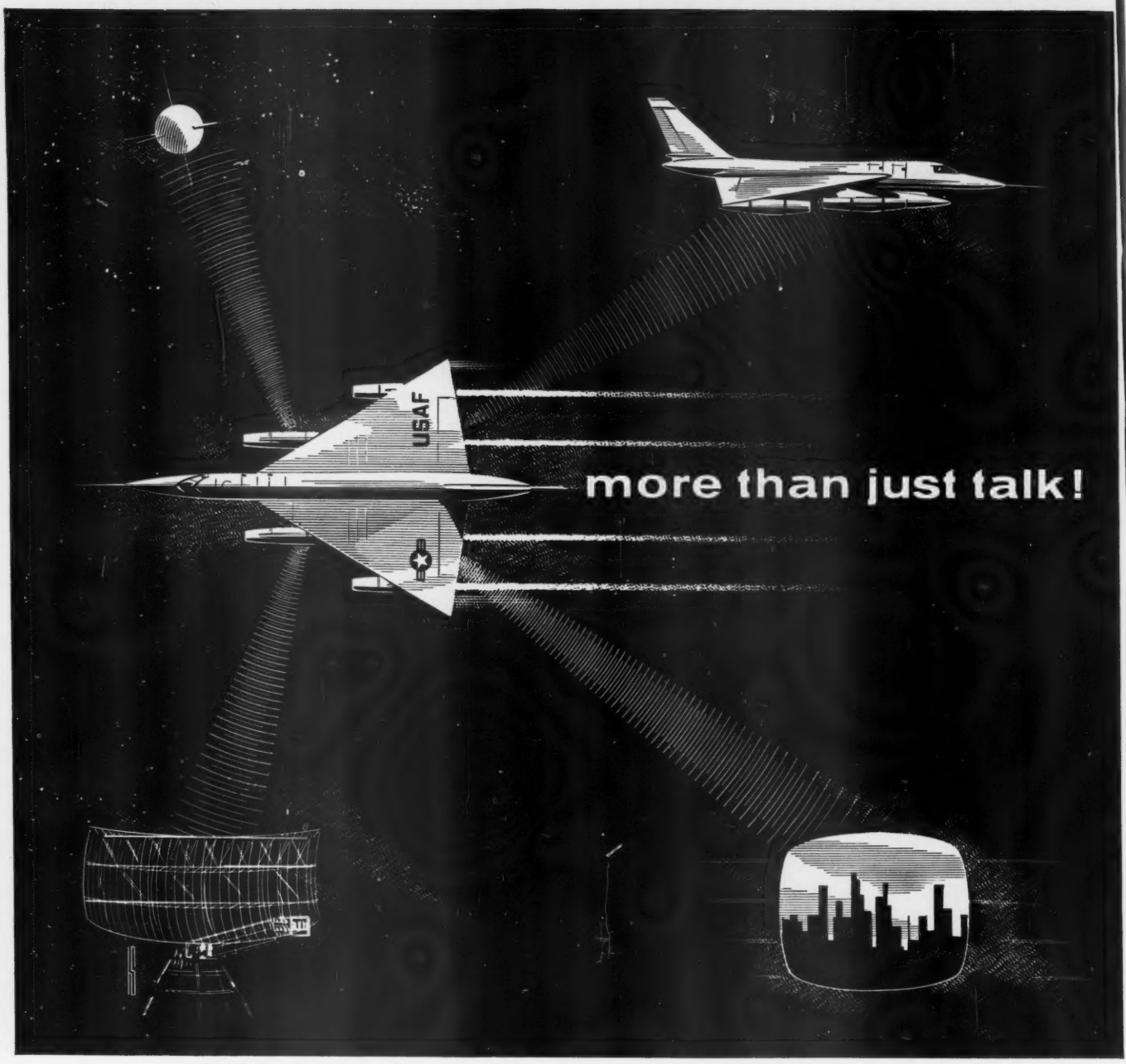

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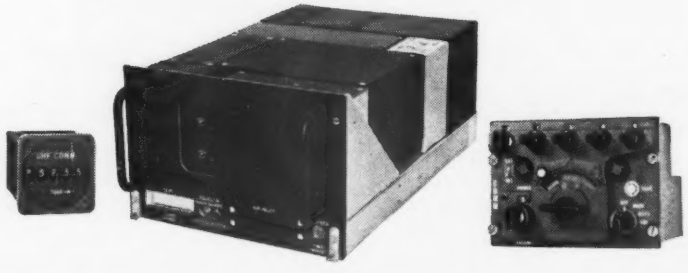

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ment would not solve the problem of reconciling entrenched organizational points of view.

"Furthermore, nonprofit organizations enable the Defense Department to bring to bear on problems which cannot appropriately be assigned to private enterprise talents not readily available to the government."

Then he added:

"There are obviously limits on the use to which such organizations can be put, and we certainly do not intend to let them become convenient catch-alls for projects within the competence of private industry.

"Government in-house activities, nonprofit organizations, and private industry all have their roles to play in the defense program. The objective should be to achieve the best possible balance among all three types of competence."

Mr. Gilpatric's reference here was to the criticism voiced in January 1960, by a committee that studied USAF's ballistic-missile management under the chairmanship of Dr. Clark B. Millikan. This group found that STL had done a good job but accused USAF of giving it too many tasks "outside its primary area." The report made it clear that systems engineering and technical direction were the essential functions.

USAF Secretary Eugene M. Zuckert has echoed Mr. Gilpatric. The nonprofit organizations, he said at a Los Angeles symposium, "are in a position to make unique and valuable contributions. It is because they are special that we turned to them in the first place. And so they must be kept, if their exceptional potential is to be fully realized. We must be particularly careful that they do not become convenient catch-alls for work which should be performed either by the Air Force or by private industry."

Mr. Zuckert pointed to the House committee's basic vote of confidence in the concept, which was aligned with a warning that a close rein must be retained. He said USAF must make it clear why the nonprofit corporation was selected to do a particular job.

"Our purpose," he said, "will be to preserve the usefulness of these nonprofit organizations by ensuring their scrupulous attention to the proprieties of public service and the bona-fide interests of the people of the United States."

This goal has been put into words as a statement of policy on USAF's relations with the nonprofit firms it has sponsored. Specifically mentioned in this regard are Aerospace, MITRE, RAND Corporation, Analytic Services, Inc., and System Development Corporation. The text of the policy statement is on page 79. It was issued over Mr. Zuckert's signature.

The policy is a new and more restrictive definition of the controls USAF intends to maintain over nonprofit corporations. Behind each of its clauses there is something in USAF's experience, usually on Capitol Hill or in its relations with production contractors, that calls for correction or a clearly stated insurance that some abuse, actual or potential, is eliminated.

Unspoken in the policy statement is the evident conviction that the more esoteric systems which lie ahead in the aerospace age require a type of competence and objectivity, so far as evaluation and technical direction are concerned, that can best be achieved through a nonprofit operation. The suggestion, made by the General Accounting Office and some members of Congress, that the government can get this kind of management with in-house capability, is rejected.

The Air Force statement on its policy toward nonprofit contractors has not been greeted with unanimous approval by the five companies to which it specifically applies. Some felt that it is too severe, others that it approaches the problem negatively. At first blush one spokesman said the statement "gravely needs revision to make its provisions positive and constructive." A high Air Force official, on the other hand, commented that "these nonprofit corporations are not traditional contractors. They have a special relationship with the Air Force that cannot be ignored. The policy statement does no more than reflect this, and, we feel, in the long run will eliminate any doubts as to the dedication of these nonprofit corporations to the public interest."

At this writing, it appears that the policy, which imposes strict monitorship on nonprofit operations, will stick and be extended to new corporations that the Defense Department is finding necessary. The extent to which this is true may be defined more clearly after the Bureau of the Budget has completed its analysis, as ordered by President Kennedy. That report was scheduled for completion December 1.

So far as the aerospace industry is concerned—and the reference here is to the profit-making production operations on which we depend so heavily for national security—it has not been demonstrated that they have lost anything to which they have undisputed title.

"It doesn't take a very good ear to pick up growls of industrial discontent about how deeply government is getting into business," said Donald Douglas, Jr., in a recent speech. "But talk about socialism is cheap, while viable solutions of the problem come a little harder."

In the seven short years since the missile program really got started there have been tremendous advances that looked nearly impossible at the outset. There have been equally great changes in the aerospace industry, yet it was by its ability to adapt itself to new management ideas while the revolution was taking place, that the industry emerged into the space age with new strength.

One House committee report, in 1959, said bluntly that "government relationships with nonprofit organizations . . . pose problems, but they are less important than the benefits received."

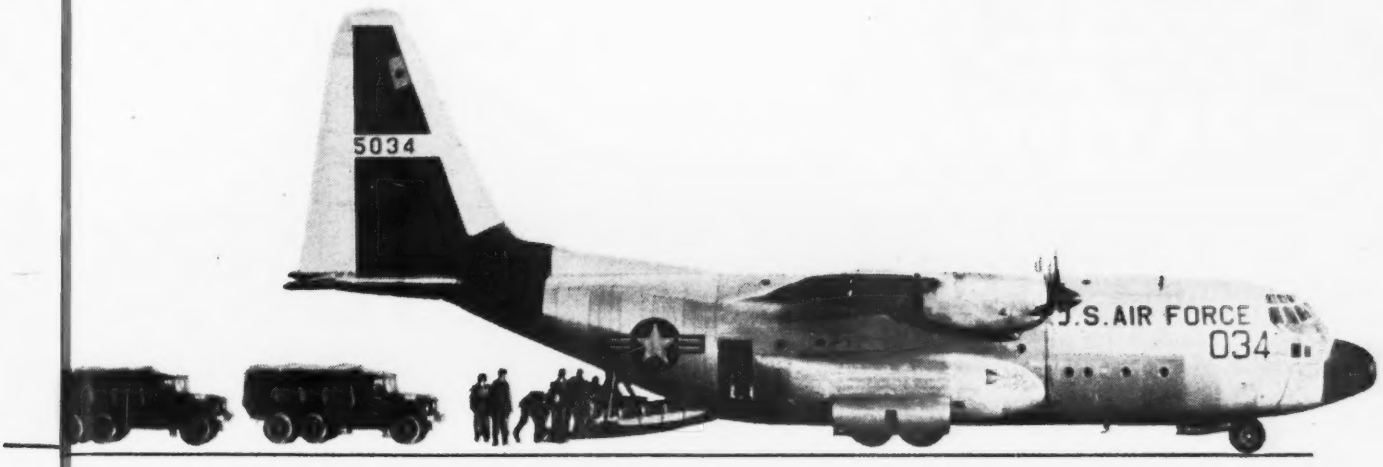
There are alternatives, of course. But these could include the development of a huge bureaucratic in-house talent, or a full-fledged return to the arsenal system. They could include stricter control of private business, right to the border or into a socialistic system. The route of the Air Force and other government agencies, utilizing the objective and competent architect engineer with nonprofit status, could be a strong defense for private enterprise against these inroads. —End

Four ways to tell a true airlifter

1. Loads from the rear

2. Truck-bed height

A true airlifter is a special breed of bird—built without compromise for its special kind of work. Huge rear doors allow cargo to be loaded straight in. Cargo floor is truck-bed height; no hoisting cargo up and jockeying it around corners. Rear doors can be opened in flight for bulldozer-size paradrops. And a true airlifter need not be pampered with paving. It lands and takes off in sand and rough dirt, close to the action, just like a bush plane. Lockheed's C-130 Hercules propjet is the true airlifter. Now in its second million miles of operation, 14 different versions are flying or being built for the U.S. Air Force, Navy, Marines, and Coast Guard—and for the air forces of Canada, Australia, and Indonesia. Newest model, C-130E, will soon haul huge cargoes on MATS' worldwide routes. The big Lockheed/Georgia cargo jets of the future will be true airlifters, too; they will have the same four basic attributes Hercules has.



3. Paradrops big equipment

4. Lands on short, rough fields

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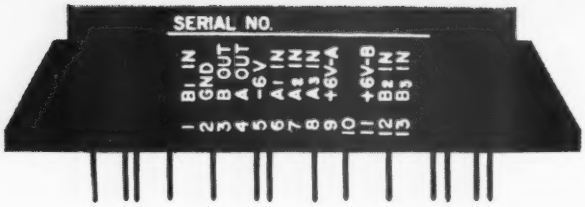

In less time than it takes light to cross this room, a new product, **DELCO'S NEW** high speed **10 MC** silicon modules, could: (1) correct the course of a missile in flight; (2) make it possible for sonar pickups to track and compute the position of targets with microsecond accuracy; and (3) handle any number of other airborne guidance and control functions that previous modules—due to low speed or environmental or performance limitations—could not handle. Delco Radio's 10mc modules, with a maximum gate-switch speed of 40 nanoseconds, convert data 100 times faster—even under the most extreme environmental conditions.

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RESERVE AND AIR GUARD NEWS AND VIEWS

By Jackson V. Rambeau
AFA DIRECTOR OF MILITARY RELATIONS

A Constructive Critique

The October meeting of the **Air Reserve Forces Policy Committee,** in the view of some observers, again demonstrated that much high-level manpower is being expended on matters that should properly be handled through normal administrative channels.

An unfortunate corollary is that the committee apparently doesn't—but very definitely should—recognize that it is the **principal policy advisory group** to the **Secretary of the Air Force for Reserve Forces,** and its primary responsibility is to tackle major policy matters affecting these forces.

In two and a half days of deliberations, the committee of **fourteen generals** and **four colonels** agreed to forward to the Secretary of the Air Force recommendations, for example, to allow **Air Reserve technicians** to attend service schools in military status if they so desire, permit **Reservists and Guardsmen** to join USAF aero clubs, and suggest that **a limited number of airmen who retired after twenty years' service** might be useful to the Reserve Forces.

But the Committee avoided taking a positive stand on a recommendation that the Reserve Forces be equipped with more modern aircraft.

A TAC proposal submitted for Committee consideration declared that equipment in our Reserve Forces is "obsolete and incapable of full mission accomplishment." It asserted that the Reserve's troop carrier fleet includes **600 C-119s** which have an "unacceptable speed, range, and economical payload capability" and that the Air Guard's tactical units are equipped mainly with **F-84F, F-86H, RF-84F,** and **SA-16** aircraft, "all of which are considered obsolete in terms of modern warfare."

"If the Air Force is to have an acceptable economy of force and achieve maximum utilization of the existing highly capable manpower resource within the **Air Reserve and Air National Guard,**" the TAC proposal declared, "urgent action is required to equip this force with like first-line aircraft of USAF tactical air forces for complete mission accomplishment in tactical air operations."

It suggested that production of the F-105, C-130E, and C-141 be expedited, so that quantities of the F-100D and C-130A and B could be turned over to the Reserve Forces.

But instead of recommending "urgent action," the Committee suggested only that the **Secretary of the Air Force** continue his "present course of action."

It is true that action to **expedite procurement of more modern aircraft** may be beyond the scope of the Secretary of the Air Force. But the same can be said of other Committee recommendations which the Secretary must refer to the **Department of Defense** or the **Congress.**

A strong recommendation by the Committee would have provided the Secretary with a positive position for transmittal to the **Air Staff. It would have strengthened the Secretary's hand in dealings with DoD and Congress.** And it might well have pointed the way toward more effective supporting action by those military and civic organizations **—including AFA—**that are concerned over our Reserve Forces capabilities.

AFA, along with other groups and individuals who share this concern, will continue, of course, to **seek to update the equipment and capability of the Reserve Forces,** but we need the forward-looking leadership that should come from the Air Force's own Reserve Forces Policy Committee.

Other Committee Actions

A number of proposals in addition to those referred to above were **acted on by the Policy Committee** during its October meeting. The Committee:

- Called for a study to **determine if survivability of Reserve Forces units would be substantially increased** by reorganizing large units into cellular structures and dispersing the cells in low-density population areas.
- **Rejected a civil-defense mission for individual Reservists,** on grounds that they're needed to support specific Air Force wartime augmentation and attritional replacement requirements.
- Urged that **dependents of Reservists killed in line of duty be entitled to the same benefits and privileges as dependents of active USAF personnel.**
- Recommended that **doctors and dentists be offered appointment in Reserve Forces units without requiring them to volunteer for immediate active duty.**
- Approved a **study of deficiencies in the recent recall of Reserve Forces units.**
- Turned down a **proposal that aircraft commanders in troop carrier units be allowed to remain in the slots when they are promoted to major.**
- Agreed that **Reserve units made up of lawyers, research engineers, or information and intelligence specialists should be retained in locations where they can be useful** in supporting Air Force requirements.
- Noted that **nonregular colonels will be accepted for the National War College and Industrial College of the Armed Forces** beginning with classes entering next fall.

The Chief Speaks

A former **National Guardsman** who subsequently entered on an active military career journeyed out to the annual conference of the **National Guard Association at Las Vegas, Nev.,** in October to reminisce with them about his Guardsman days.

He was **Gen. Curtis E. LeMay, USAF's Chief of Staff.** During his visit, neither the guest nor the hosts chose to recall publicly that a couple of years ago General LeMay had made some extemporaneous remarks about Air Guard inefficiency that prompted the Guard Association to call for his removal as Vice Chief of Staff.

The rift has long since been smoothed over. As General LeMay said in his address:

"We have come to know each other better. **Reservists and active-duty Air Force personnel** working side by side . . . have developed a mutual respect for each other's ability and professional competence."

It was shortly after he was graduated from **Ohio State University** in 1928 with an ROTC commission, General LeMay said, that he was first exposed to the "resourcefulness that has always been a strong factor in the activities of the Guard."

He called on **Brig. Gen. Harold M. Bush,** a field artillery

(Continued on following page)

brigade commander in the Ohio Guard, explaining that he had applied for pilot training and that while he was waiting he was "interested in doing some soldiering."

Within an hour, he said, General Bush **appointed him an officer in his brigade** and ordered him to report for summer camp in two days. When he explained he couldn't go because he didn't have a uniform, General Bush promptly outfitted him with the uniform of a recently deceased Guard officer. General LeMay went to camp on time.

General Eaton Retires

Maj. Gen. Robert E. L. Eaton, Assistant Chief of Staff for Reserve Forces, will retire December 31 after thirty years' service.

His retirement is the second by a top Reserve leader in the past three months. **Lt. Gen. William E. Hall** retired as CONAC commander on September 30.

A native of Sullivan's Hollow, Miss., General Eaton is a 1931 graduate of West Point. During World War II **he organized and led the 451st Bomb Group, a B-24 bomber outfit, in Italy, France, the Balkans, and Germany, logging more than 300 combat hours.** For eight years after the war he served in Pentagon staff posts, then commanded the **6th Allied Tactical Air Force** in Turkey for two years before assuming command of the Tenth Air Force in 1955.

AFA saluted General Eaton for his "outstanding contributions to aerospace power" by awarding him a **Citation of Honor** at the **1961 National Convention in Philadelphia.**

His successor had not been named when this issue went to press.

Maj. Gens. Winston P. Wilson and **Chester E. McCarty,** deputies to General Eaton for the Air Guard and Reserve respectively, and both career Reservists, remain to provide experience and continuity at the Pentagon level.

Recoverers Disappointed

The struggle to acquire full **Category A status** with forty-eight paid assemblies a year for Reserve recovery personnel took a discouraging turn when the Department of Defense created a new **Category B** specifically for these units with the stipulation that they will meet, and be paid for, only twenty-four sessions a year.

The Air Force has contended that the units are performing an essential mission with a workload that requires **forty-eight drills a year.**

If the recovery mission is truly essential, as the Air Force insists, the **units should be turned over for training and inspection to those gaining commands that would need the dispersal recovery bases before or after an attack.** It would then be the responsibility of the gaining command to see that its units have a firm mission directive. The command would prescribe training programs, establish requirements for equipment, and work with them on frequent training exercises.

Recovery units have been successful so far in recruiting personnel, even with the **twenty-four-drill limitation.** But they need more guidance from their prospective customers **—the major operating commands**—if they are to hold qualified men.

Guardsmen in William Tell

The **Air Guard's 182d Interceptor Squadron** of Kelly AFB, Tex., placed second in the F-102 category and second over-all in **ADC's William Tell** weapons meet at Tyndall AFB, Fla., late in October.

The **59th Fighter-Interceptor Squadron** of Goose Bay, Labrador, fired a perfect score of 4,000 points to win. The Texas Guardsmen, led by **Lt. Col. Noel Didier,** commander of the parent **136th Wing** in Dallas, were second with 3,100.

No other team in the three categories, which included F-106s and F-101Bs as well as F-102s, reached 3,000 points.

The Goose Bay unit made the second perfect score in weapons-meet history, duplicating the achievement of the Florida Air Guard's **159th Fighter-Interceptor Squadron** in 1958.

Up and Overseas

The call-up of Air Guard and Reserve squadrons, and deployment of Guard fighter and reconnaissance units to Europe, went off with only minor hitches. Secretary Zuckert called it **"highly successful."**

Ben Fridge, special assistant to the Air Force Secretary for Manpower, Personnel, and Reserve Forces, said he had received "very favorable reports concerning the smoothness and efficiency with which our recall of Reservists was executed."

Movement to European bases proceeded ahead of schedule. Tactical fighters and reconnaissance planes island-hopped to Europe, **F-86Hs** going via Sondrestrom and Keflavik and **F-84Fs** and **RF-84Fs** via the Azores. **F-104** squadrons, which entered on active duty November 1, were expected to be leaving for Europe before the end of the month.

Meanwhile, **Air Guard C-97** and **Reserve C-124** squadrons accelerated their proficiency training to be ready for full-scale mission duties by the first of the year.

The principal problem area was in the **three F-104 groups which were to take barely half of their personnel** with them to bases overseas. The Air Force apologized for violating its promise to maintain unit integrity but explained that the squadrons had originally been set up as air defense units with enough support personnel to make them self-sustaining. In Europe they will operate from **existing bases where support units are already in place.** Consequently, more than 300 men in each of the F-104 groups were to be assigned elsewhere where they are needed to meet augmentation requirements.

Mr. Fridge has called for **a report on mobilization problems,** together with recommendations for avoiding such problems in the future. The Air Reserve Forces Policy Committee, it might be noted, recommended such a study, as reported above.

• • •

SHORT BURSTS: The **Air Reserve Records Center** proved it maintains timely and accurate information on Reservists by its speedy job in coming up with specialized personnel to fill vacancies in **Reserve and Guard units** during the recent mobilization. . . . Reserve Forces leaders are highly impressed by the energy displayed by **John Lang** in tackling his job as **Deputy for Reserve and ROTC Affairs.** Mr. Lang is pursuing a vigorous schedule of visits to units and gaining commands. . . . DoD has turned down the Air Force requests on several occasions for a more **equitable share of Reserve drill pay spaces.** Of the more than one million spaces authorized by DoD, the **Army** has 700,000; the **Navy-Marine Corps** 175,000; and the **Air Force** only 135,000. It could be coincidental, but the office in DoD which has consistently turned down the Air Force is completely dominated by Army personnel. . . . Word is that the **next upheaval in the Reserve program will involve the future of CONAC.**—END

Tuesday morning at Catalytic

At regularly held meetings the Project Manager on each current job, with the aid of the "Critical Path" Schedule, discusses progress with top-level management and the project team.

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Seated above from the left at a recent meeting: Richard P. Klopp, Vice President—Sales; W. Graham Jamison, Vice President—Administration and Treasurer; George F. Klein, Vice President—Engineering; Alan T. Knight, President.

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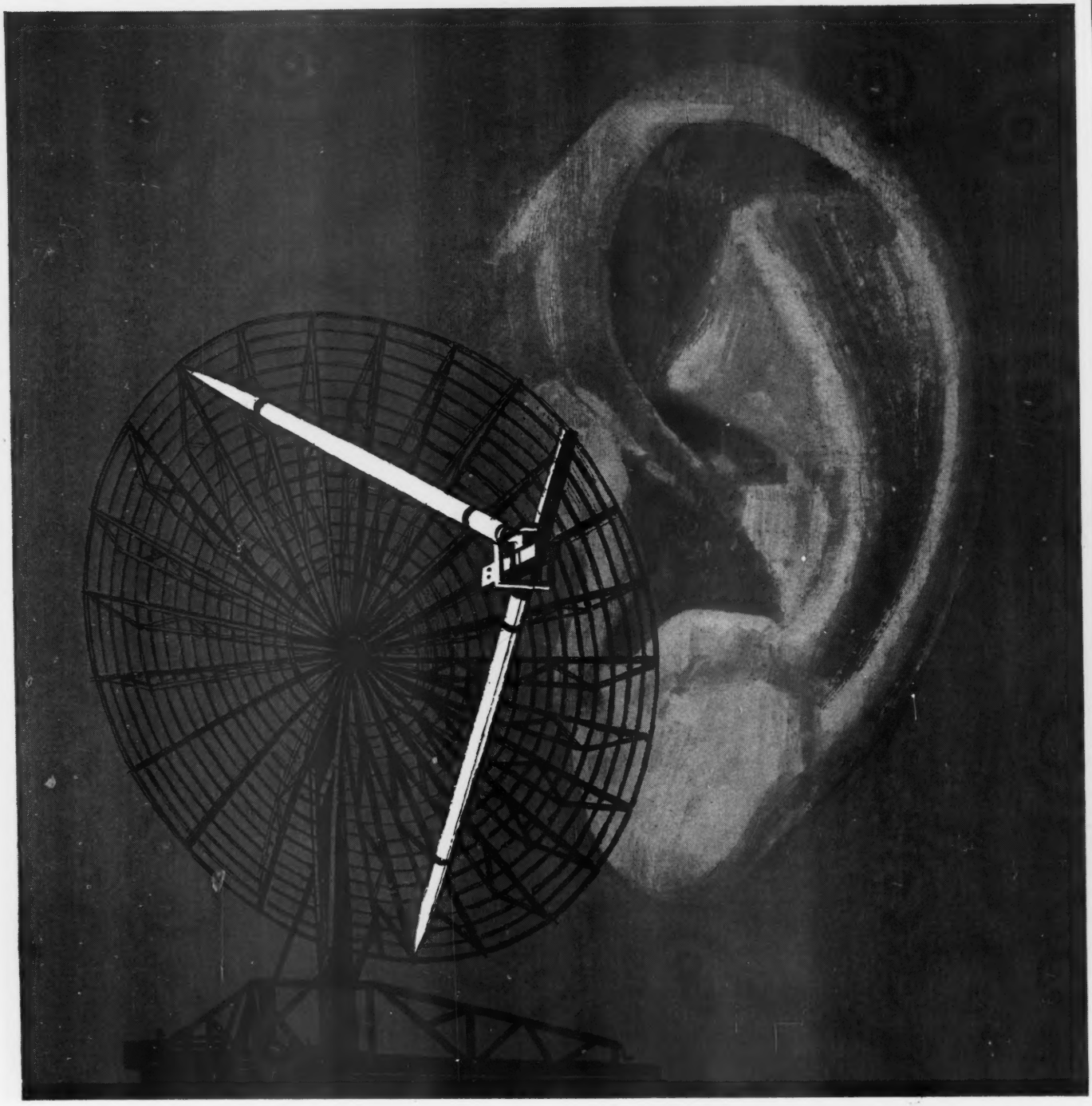

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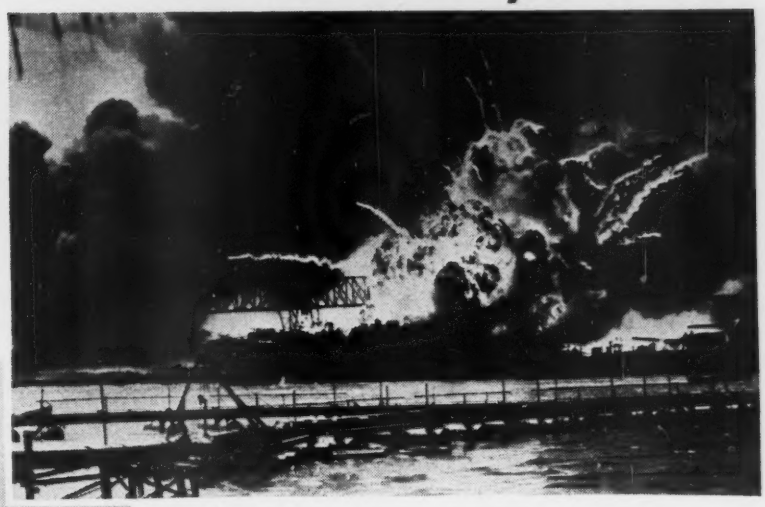
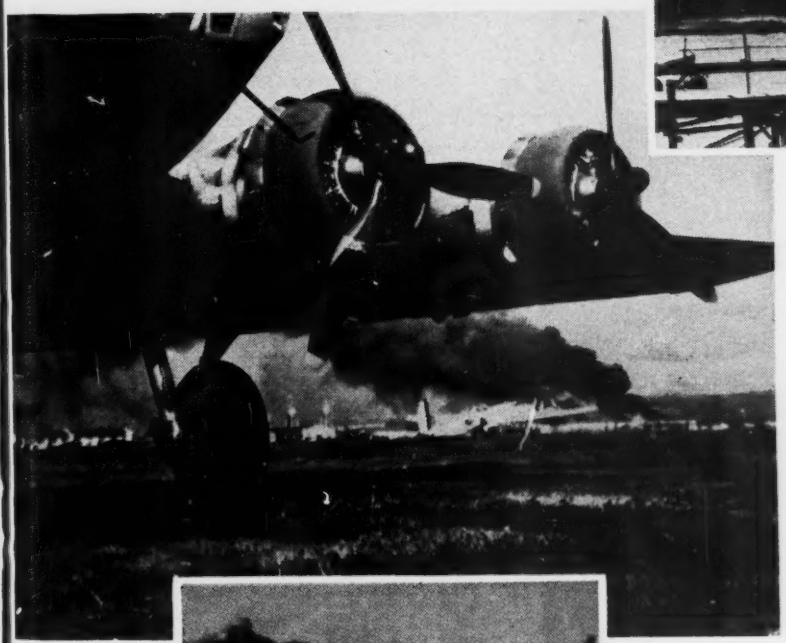
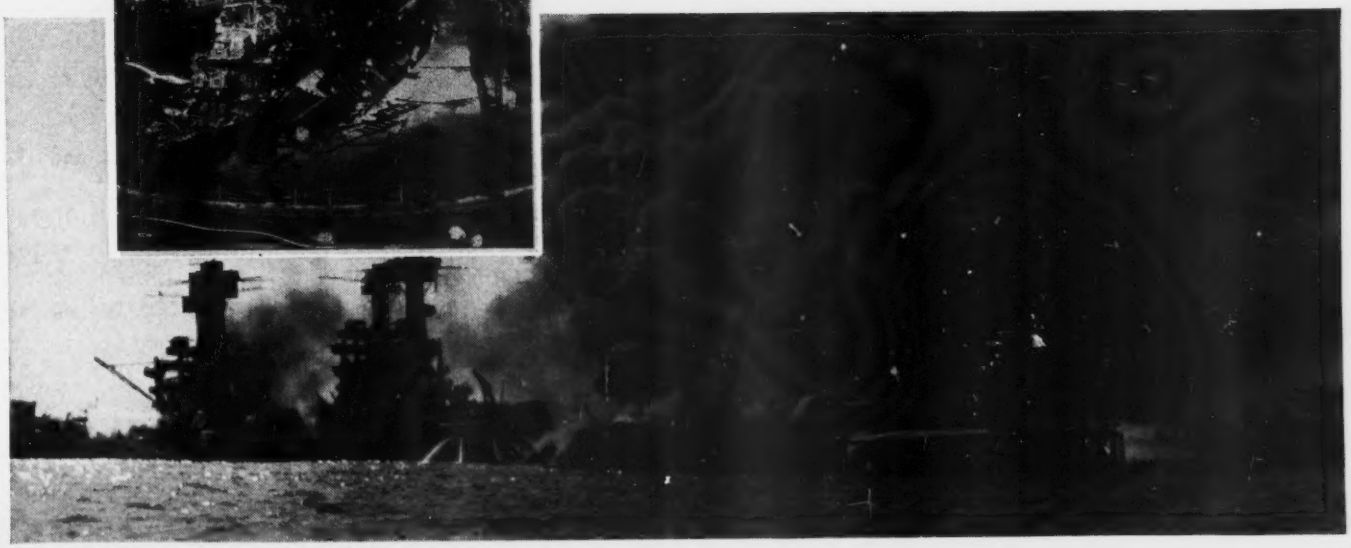
So Well Remembered . . .

December 7, 1941





On the morning of December 7, 1941—twenty hot- and cold-war years ago this month—the forces of Imperial Japan attacked without warning the US naval base at Pearl Harbor, the Army's Hickam Field, and other military targets in what is now our Fiftieth State. This was the disastrous prelude to the bitter Pacific war that ended four years later with total defeat for the war lords of the Rising Sun. As he led the nation into war, President Roosevelt pledged steps to ensure that "this form of treachery will never again endanger us." With that credo for today, and in memory of all who died in defense of freedom that fateful day and who have died since—this page is respectfully dedicated.



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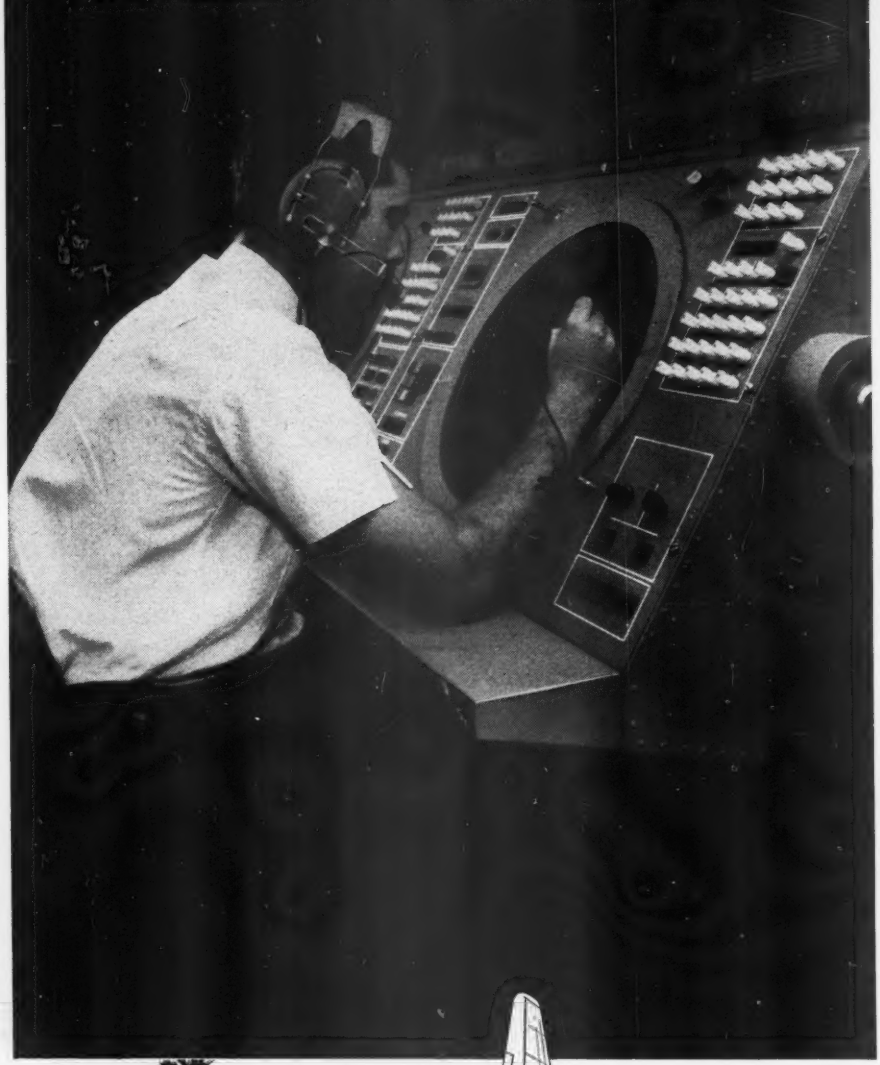

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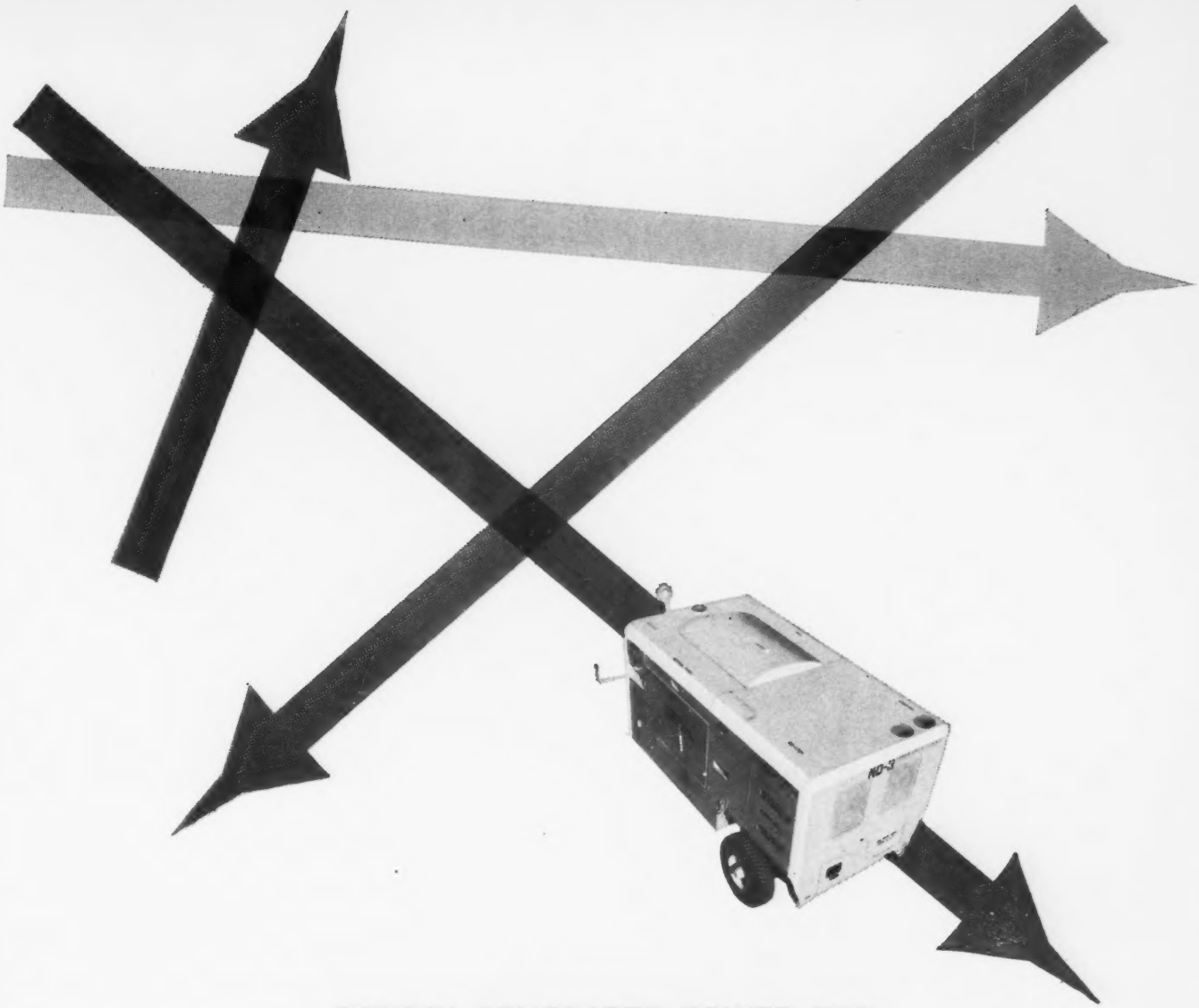

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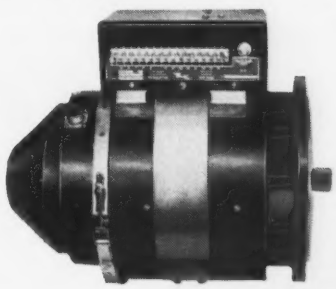

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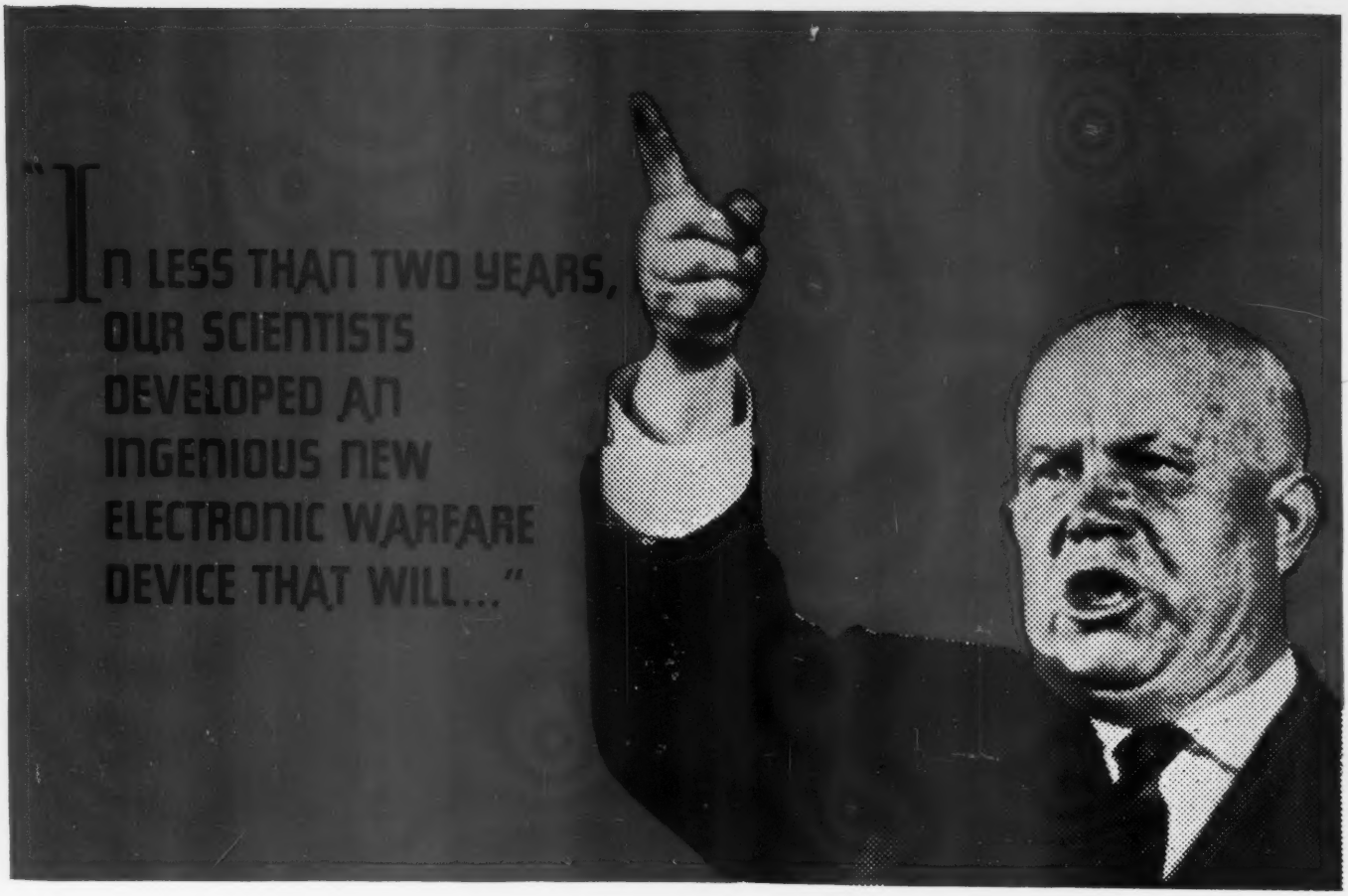

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AFA NEWS

SQUADRON OF THE MONTH

San Francisco, Calif., Squadron Cited for

imaginative and successful community representation of the objectives of the Air Force Association.

AFA's San Francisco Squadron has again sponsored its unique program, the **"Commanders' Reception,"** an evening devoted to paying tribute to all new **Air Force commanders throughout California.** The third annual program was held September 13 under the general chairmanship of **Alfred M. Oppenheim,** Squadron Commander.

Fourteen commanders, headed by **Lt. Gen. Howell M. Estes, Jr.,** deputy commander for aerospace systems, AFSC, were honored. Others were **Maj. Gen. Glen R. Birchard,** commander, Western Transport Air Force, MATS; **Maj. Gen. Thomas P. Gerrity,** commander, Ballistic Systems Division, AFSC; **Maj. Gen. Robert B. Landry,** commander, Sacramento AMA, AFLC; **Maj. Gen. Conrad F. Necrason,** commander, 28th Air Division (SAGE), ADC; **Maj. Gen. Mervyn M. Magee,** US Army, commander, 28th NORAD Region; **Maj. Gen. Joseph J. Preston,** commander, 1st Strategic Aerospace Division, SAC; **Brig. Gen. Irving L. Branch,** commander, AF Flight Test Center, AFSC; **Brig. Gen. Richard F. Bromiley,** deputy commander, Western Transport Air Force, MATS; **Brig. Gen. Robert D. Campbell,** commander of the newly activated 146th Air Transport Wing, MATS; **Brig. Gen. Thomas K. McGehee,** commander, San Francisco Air Defense Sector, ADC; **Brig. Gen. William R. Yancy,** commander, 47th Air Division, SAC; **Col. Harvey E. Henderson,** commander, Hamilton AFB, Calif.; and **Col. Edwin A. Bland, Jr.,** commander, Travis AFB, Calif.

William P. Gilson, Far West Regional Vice President; **Carson P. Sheetz,** *California Wing Commander;* and a host of San Francisco Squadron members completed the glittering array of notables gathered to welcome the new USAF commanders to California. We congratulate the Squadron, which again has distinguished itself with its imaginative and highly successful community programing.

* * *

The **California Wing** was scheduled to hold its annual **Mid-Year Conference** in **Pasadena's** Huntington-Sheraton Hotel **November 3-4,** as we went to press, under the chairmanship of **Squadron Commander C. S. "Bill" Irvine** and a host committee. It was to be a three-pronged function, combining the **regular business affairs** of the Mid-Year Conference; an **Aerospace Education Seminar** featuring the **Air University Briefing Team,** presenting a **"Survey of Astronautics"** for 350 educators and guests; and a glittering **banquet** on November 4 commemorating the **fiftieth anniversary of the first transcontinental US crossing** by an aircraft.

Vin Fiz was the name of that first

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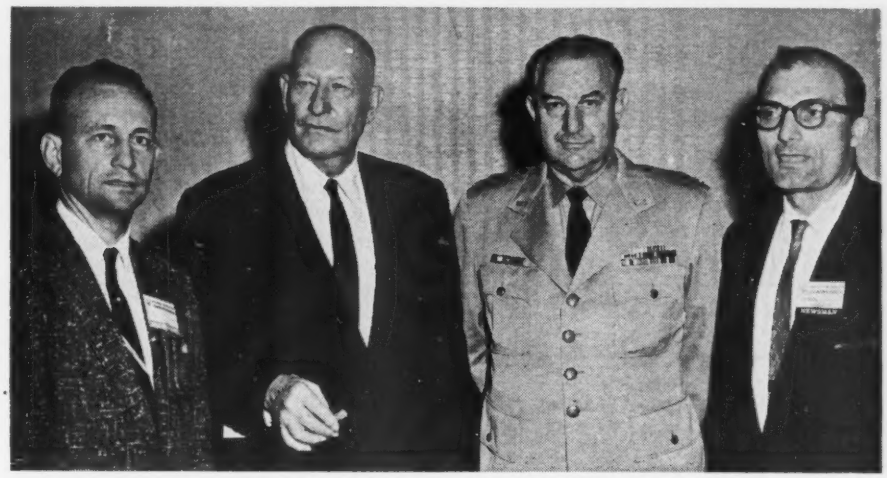

California Wing officials planning Wing's Mid-Year Conference held November 3-4. Left to right, John L. Beringer, Jr., Vice President of AFA's Far West Region; retired Gen. C. S. Irvine, Pasadena Area Squadron Commander; Col. T. W. Ward, Squadron Vice Commander; and Robert F. Brooks, General Chairman of "Operation Vin Fiz" commemorating the first transcontinental air crossing of the US.

Sen. Barry Goldwater (R.-Ariz.) meets his hosts, members of Leonard E. Thomas Squadron, Van Nuys, Calif. Senator Goldwater, at far right, was main speaker at Squadron's annual dinner-dance. Greeting him are Brig. Gen. Robert Martell, state's Deputy Adjutant General (Air); Brig. Gen. Robert Campbell, commander of the 146th Air Transport Wing; Maj. Fred Kranz, Squadron Commander.

cross-country craft piloted by **Calbraith P. Rodgers.** He took forty-nine days to complete the trip, thereby missing the $50,000 prize that had been offered for a thirty-day flight. But he nevertheless achieved a historic and significant feat. Rodgers' widow and one of his mechanics, **Charles L. Wiggin,** who became man and wife years ago, were to be on hand for the anniversary observance.

Principal speaker for the dinner was **Gen. Bernard A. Schriever,** commander, Air Force Systems Command; the toastmaster, **Gill Robb Wilson,** publisher of *Flying* magazine and a past president of AFA. **Robert F. Brooks,** long a leader in California AFA activities, was general chairman for the week-end program which attracted attention throughout the state and was well attended.

* * *

Several AFA Squadrons face a serious problem in the immediate future, due to the **reactivation of many Air Guard and Reserve units** and the fact that individuals in these units are also **leaders of our Squadrons.** One of the Squadrons facing what amounts to decimation is the **Leonard E. Thomas Squadron** of Van Nuys, Calif., whose membership is composed completely of ANG personnel of the **146th Air Transport Wing.**

The recall to active duty didn't stop the Squadron from sponsoring a big affair in September, though, just a few days before reporting. **Sen. Barry Goldwater** (R.-Ariz.), brigadier general, USAFR, was the guest of honor at the Squadron's annual dinner-dance, held at Knollwood Country Club in Granada Hills. More than 450 members, friends, and guests attended the program. They gave Senator Goldwater a standing ovation for his remarks on **"Airpower—The Key to American Military Strength."**

Fred Kranz, Squadron Commander, was in charge of the arrangements for the event.

* * *

California Wing's **Robert H. Goddard Squadron,** named after the "Father of American Rocketry," appears to have gotten off the ground in keeping with the namesake of the unit.

Chartered in July, the Squadron has already cosponsored a huge Air Fair at **Vandenberg AFB, Calif.,** and on October 13 was the single sponsor of a **Charter Dinner** at which the guest speaker was **Sen. Howard W. Cannon** (D.-Nev.). He made the trip to the West Coast missile base in a T-33, wearing his other hat as a brigadier general, USAFR.

Jack Withers, a civilian employee of the **Martin Company** at Vandenberg, is Squadron Commander. Under his leadership the unit appears well on its way to becoming **one of the Association's top Squadrons.** The dinner was attended by more than 300 people.

Maj. Gen. Joseph J. Preston, commander of SAC's 1st Strategic Aerospace Division, was a guest. He commented briefly on welcoming the Squadron to Vandenberg. Toastmaster for the affair was another well-known Air Force Reservist, **Col. Gene Raymond,** film and television star.

* * *

Miss Gloria Watson is the new commander of **New York's Squadron #1 (WAF).** Miss Watson, the daughter of a former WAF Squadron Commander, is an Associate member of AFA. She thereby becomes the **first Associate to hold office in the organization.** This move is made possible by a **resolution** approved by delegates to the 1961 National Convention. Under it, Associate members, after three years service to AFA, are eligible for election to Squadron office.

—Gus Duda

Miss Gloria Watson, commander, New York Squadron #1 (WAF).

Talking over AFA activities at Robert H. Goddard Squadron charter dinner, held at Vandenberg AFB, are: Maj. Gen. Joseph J. Preston, commander, 1st Strategic Aerospace Division; US Senator Howard W. Cannon, guest speaker for the dinner; film and television personality Gene Raymond, who served as master of ceremonies; and Jack Withers, commander of newly formed Goddard Squadron.

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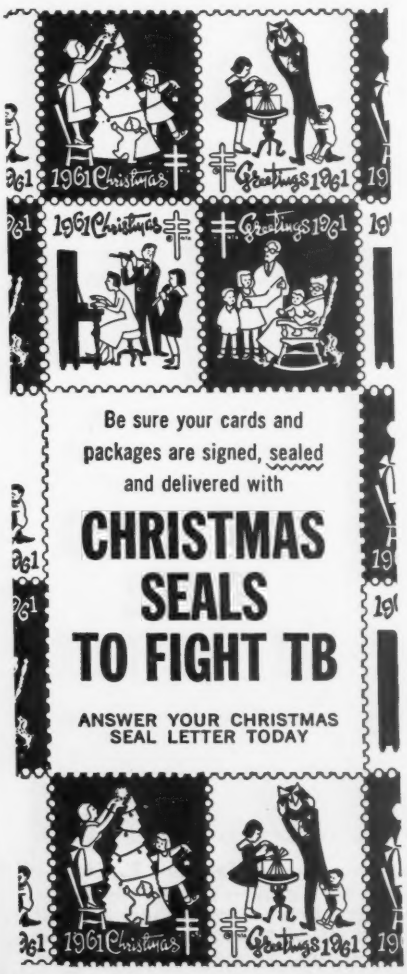
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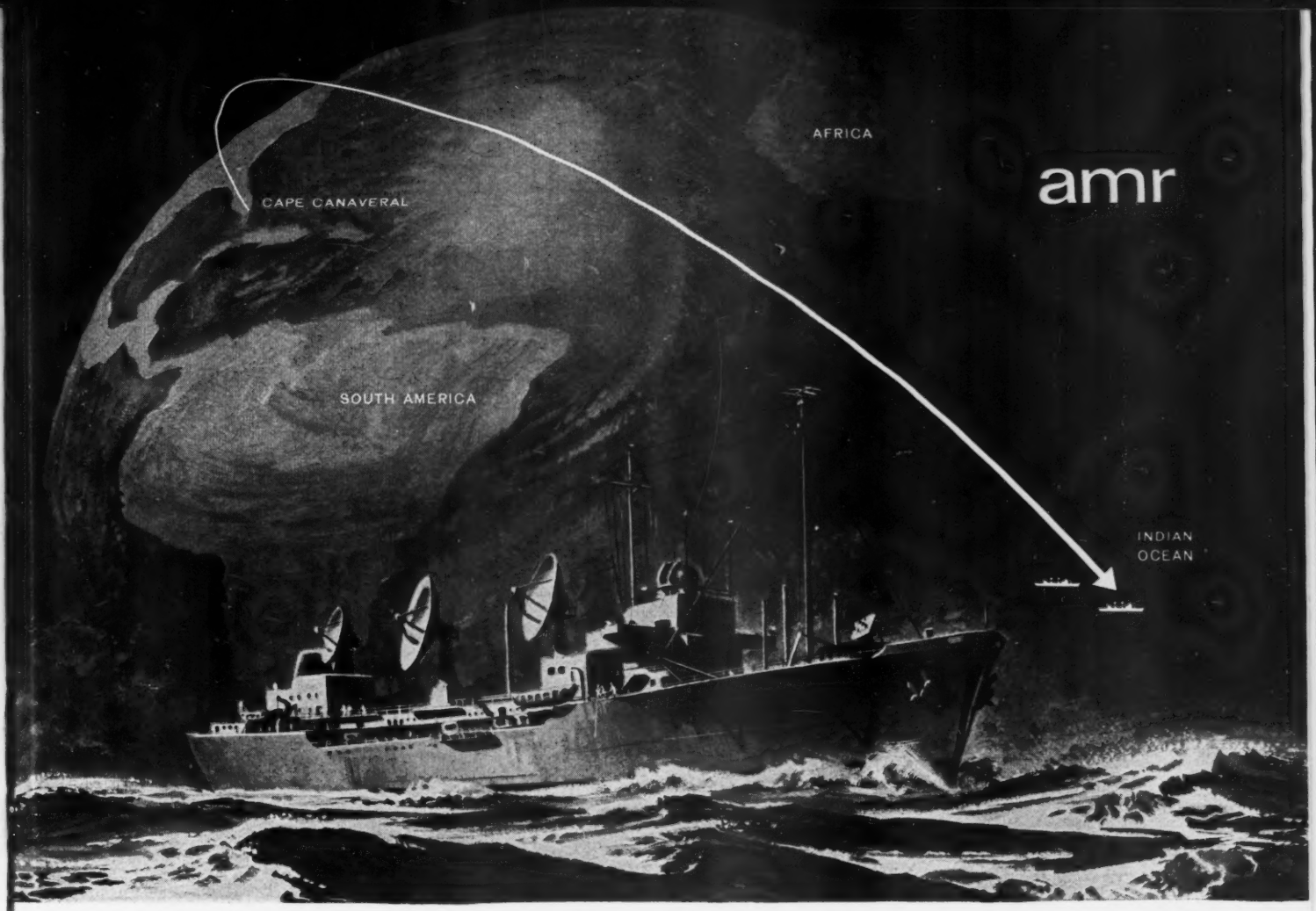
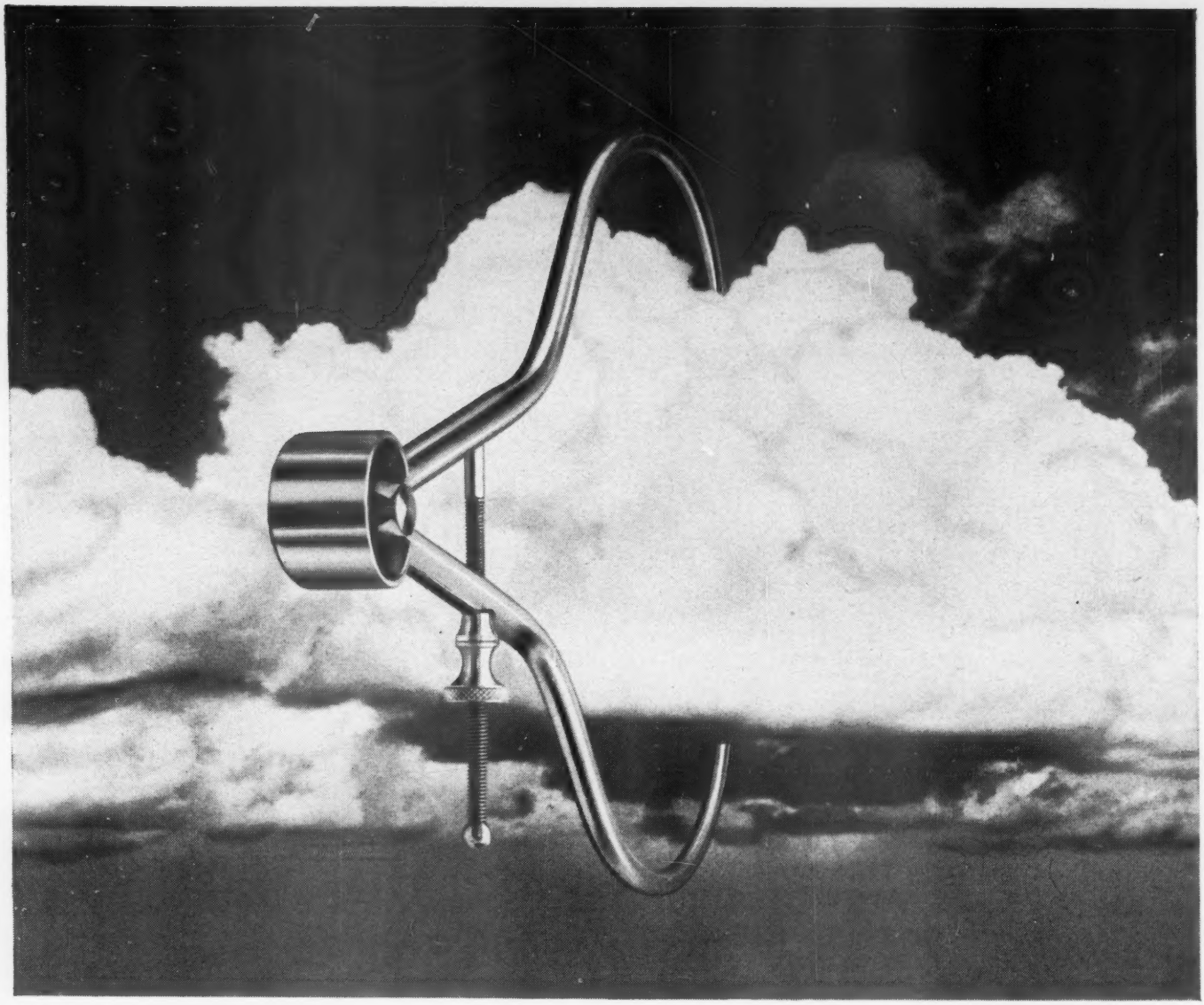


Objective: increase capability of the Atlantic Missile Range—sponsored by the Missile Test Center of the Air Force Systems Command—to study missiles and space vehicles during the critical terminal phase of flight with a refinement never before possible. Prime requisite: *mobility* . . . ability to move to the most advantageous position in thousands of miles of ocean.

The answer: conversion of two large troop transports into Mobile Atlantic Range Stations, seagoing laboratories incorporating every proven technique of instrumentation, data acquisition, and instantaneous data transmission to Cape Canaveral, integrated with the most sophisticated long range tracking radars. System Manager: The Sperry Rand Systems Group. General Offices: Great Neck, N. Y.

The Mobile Atlantic Range Stations will be equipped with integrated radar, telemetry, infrared tracking, data handling, communications, inertial navigation, and sophisticated weather forecasting. Team members include Bethlehem Shipbuilding, Ford Instrument, Gibbs & Cox, IT&T, Remington Rand UNIVAC, Sperry Gyroscope Company.

SPERRY



Siegler puts calipers on a cumulus cloud

Siegler Cloud Height Radar, developed for USAF, *visually maps,* for the first time, not only height and horizontal dimensions but also *upper limits and density* of cloud formations directly over the airport—both critical factors in jet flight control.

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airman's bookshelf

After Pearl Harbor

But Not in Shame, by John Toland (Random House, 1961, 402 pp., $6.50).

Reviewed by Robert F. Futrell

But Not in Shame is the human-interest history of the first six months of World War II in the Pacific, months when poorly prepared American and Allied land, sea, and air forces were everywhere outmaneuvered and outfought by the all-victorious might of Imperial Japan.

Organized in roughly chronological episodes, *But Not in Shame* begins with the story of the failure of diplomatic negotiations between the United States and Japan prior to December 1941, recounts the attack at Pearl Harbor, traces Japan's early victories. It culminates with the Doolittle raid against Tokyo and the Japanese defeat at Midway, events that portended eventual American victory over the Japanese. The author attempts to give equal treatment to both Japanese and Allied experience.

Mr. Toland is a finished craftsman. He has made good use of published histories bearing on his subject, including official US Army, Navy and Air Force histories. More important, he has filled out the bare bones of history with prodigious research and a great number of personal interviews.

Mr. Toland traveled close to 100,000 miles and interviewed almost 800 people who had stories to tell him or never-before-disclosed manuscripts to show him. He has not only been able adequately to record the story of Japan's side of the war, but he has also discovered many new facts to answer questions that have puzzled earlier authors and historians. Former President Sergio Osmeña disclosed the patriotic motivation of many of the Filipino collaborationists. Japan's General Akira Nara provided new information about the first Japanese breakthrough on Bataan. The reader discovers something about the tremendous pressure brought to bear on Japanese General Homma by his arch-enemy Premier Tojo to wind up the lagging campaign in the Philippines. In order to develop this story, Mrs. Masaharu Homma allowed Toland to read her husband's diary and his last letters. One also learns many new details about such matters as the rapid crumbling of Singapore's supposedly impregnable defenses, the ultimate American surrender in the Philippines, and the infamous Death March out of Bataan.

Of special interest to the Air Force reader will be the new evidence revealed in answer to the question of why the Far East Air Force's new B-17 bombers were not allowed to strike Formosa in the hours after the war's beginning—a decision which in no small part led to the destruction of many of these proud planes on the ground at Clark Field near Manila later on the day of December 8, 1941. Toland's new evidence supports Gen. Lewis Brereton's report that he was forbidden to make the "first overt act" even after the Japanese had commenced hostilities at Pearl Harbor.

Although he will realize that the simple limitations of space forced Toland to draw the line somewhere, the Air Force reader will doubtless note and regret that too little attention has been given to the continuing efforts of the Far East Air Force to defend the Netherlands East Indies barrier in the weeks following its withdrawal from the Philippines to bases in Australia and Java. It is similarly regrettable that space limitations compelled Toland to cut from his final draft new information which he had gathered about Gen. Claire Chennault's Flying Tigers.

In the concluding statement in the volume, Toland wisely observes: "The past must not be forgotten, or even forgiven—only understood." But what are the really important lessons for the future which one may draw from this tragic experience? Certainly in an age of aerospace and thermonuclear weapons we must above everything else recognize that preparedness allows nations to deter aggression and to win wars if they occur. Allied weakness in the Pacific permitted Japanese militarists to expect a quick victory; had the situation been otherwise, Japan might never have gone to war.

We must also realize that any nation which is forced to endure a significant period of defeat and retreat while absorbing a modern enemy offensive will never again be able to recover and to mobilize its strength for eventual victory. It would appear, moreover, that the requirement for exactly defining what constitutes an "overt act" of war is vastly more important today than it was when the failure to recognize a first-class overt act and to launch an immediate air offensive from Clark Field led to the virtual destruction of the Far East Air Force, which, after all, was the only real potential which the United States possessed for the defense of the faraway Philippines on December 8, 1941.

ABOUT THE REVIEWER: *Dr. Futrell is Professor of Military History, USAF Historical Division, Research Studies Institute, Maxwell AFB, Ala. He is the author of the new history,* The United States Air Force in Korea, 1950-1953.

NOTE: Any book reviewed in Airman's Bookshelf may be obtained, postpaid, from the AeroSpace Book Club, 1901 Pennsylvania Ave., N.W., Washington 6, D. C. Full payment must accompany order. Information on the Book Club may be obtained from the same source. Club members are eligible for substantial savings on Club selections.

All Black and White

Combat Missileman, by James Baar and William E. Howard (Harcourt, Brace & World, 1961, 244 pp., $4.75).

Reviewed by J. S. Butz, Jr.
Technical Editor, Air Force/Space Digest

The American people are confused about the current military situation and do not fully understand that their survival is at stake today in the struggle between East and West. This is the theme of *Combat Missileman*. It is a fairly standard one. Most people one talks with, in Washington at any rate, do not believe that the nation is fully informed or completely aware of vital and urgent issues of national security before us.

James Baar and William Howard, the senior and managing editors, respectively, of *Missiles and Rockets* magazine, present the story of ballistic-missile development and operation in the United States. This story is interspersed with discussions of national strategy taken primarily from testimony of Gen. Thomas S. Power, Commander in Chief of the Strategic Air Command, and "color" episodes of the tribulations of SAC's missile and aircraft crews.

The mass of information in the book includes a detailed ballistic-mis-

(Continued on following page)

sile chronology covering such major points as Karl Bossart's pressurized-propellant-tank design, Convair's MX-774 project, the Air Force's unsuccessful argument for the ballistic missile with the Truman Administration, the Von Neumann recommendations to the Eisenhower Administration, the early growing pains of USAF's Western Development Division and Ballistic Missile Division under General Schriever, the arguments for and against Ramo-Wooldridge in connection with USAF systems management, the Atlas program, the labor and construction problems of activating the ballistic-missile sites, training of crews, and the precision operations of the Strategic Air Command with both missiles and aircraft.

However, with this collection of pertinent material, it is doubtful that the authors have encouraged better understanding on the part of the general public. Their presentation is completely black and white. It resembles their description of the Eisenhower view in which the world, so they say, was made up of "good guys" and "bad guys." Baar and Howard see it this way, apparently: Since World War II the Presidents of the United States have acted as "bad guys." The generals leading the Air Force have played the role of "good guys." In the opinion of this reviewer, regardless of how strongly one believes that civil leaders have misdirected and obstructed the military, it is somewhat overreaching to judge that Truman, Eisenhower, and Kennedy all have continually put politics before national safety. The reader is offended by this premise.

The military ideas in this book all stem from one assumption—that the Russians would have many more intercontinental ballistic missiles than the United States from 1959 to 1963 or later. In the face of strong political pressure, the Eisenhower Administration steadfastly maintained that this was an incorrect assumption and that there would be no missile gap. The Democrats used this gap idea as a political cudgel during the presidential campaign. But once in power they began to change their minds. Now the Kennedy Administration has finally agreed that there is indeed no missile gap. This Administration position has been reported since the publication of *Combat Missileman*. The new Administration now says that the Soviets only have fifty ICBMs and 150 long-range bombers—not nearly enough to "bury" the free world.

It will require a more penetrating analysis than *Combat Missileman* to satisfactorily illuminate the complex and vastly important problem with which it deals.

Salute to the Past

***Early Air Pioneers, 1862-1935*, edited by Maj. James F. Sunderman, USAF (Franklin Watts, 1961, 272 pp., $4.95).**

Reviewed by Richard M. Skinner
Managing Editor, Air Force/Space Digest

Jim Sunderman, who for a number of years now has conducted AIR FORCE Magazine's book column in this space and who, "in real life," has long been the able Chief of the Air Force's Book Program, now has gone beyond the call of duty in adding a title of his own to the burgeoning literature of the air.

Major Sunderman has, in *Early Air Pioneers*, produced the first in a projected trilogy of anthologies, to be called "The Watts Aerospace Library." It's an ambitious undertaking. *Early Air Pioneers*—a good job of covering the ground, or air, between the Civil War and the mid-1930s—is a worthy first entry.

The other two titles are *World War II in the Air* and *From Jets to Space Flight*. Both are to be published by Franklin Watts, Inc., New York.

The forty-odd selections in this first volume are arranged in four general groupings—"In the Beginning," "Powered Flight," "World War I," and "The Years of the Air Pioneers." The latter, comprising nearly half the book, is the best of the four, possibly because the barnstorming, record-setting, pioneering days of the '20s and early '30s have not been so well or so generally documented as either World War I or the saga of the Wright brothers.

An introductory essay precedes each of the sections and is helpful in setting the mood for what follows. The selections themselves come from a variety of sources, books and magazines, old and new. Five of the articles were originally in AIR FORCE Magazine, and of these five, four also appear in AIR FORCE's own anthology, *The Wild Blue*, which was published earlier this year and with which *Early Air Pioneers* and its subsequent companion volumes may fairly be compared as to content and treatment. Both cover much the same story, though the Sunderman series, by not being restricted to military air activities and because of its three-volume format, is somewhat more farther-ranging.

Early Air Pioneers is liberally illustrated in what is generally a fine selection of pictures. An unfortunately flat reproduction of the photos, however, tends to detract from the over-all excellence of their subject matter.

The one thing this book does not do well is identify the contributors. There is a consolidated listing of credits up front which pinpoints sources, but the average reader of *Early Air Pioneers* may be frustrated, possibly even confused, as to who the authors are. It would be nice to believe that all readers of aerospace literature know who Gill Robb Wilson is, for example. Five of the selections in the book, including the moving final entry—which is the introduction to Gill Robb's own book, *The Airman's World*—are by Mr. Wilson, whose own colorful life would make quite a book.

Another selection documents the last hours of the Navy dirigible *Akron*, which was lost in 1933 in an Atlantic storm. The author is John Toland, a name that will mean something to some readers, but it would have been useful for *all* readers to know that Toland wrote *Ships in the Sky* and *Battle: The Story of the Bulge*, and has just had published his new book *But Not in Shame*, which is reviewed on page 99.

Other contributors to *Early Air Pioneers* whose names are well known include Quentin Reynolds, Bernt Balchen, Eddie Rickenbacker, and Arch Whitehouse. But some are not so familiar: Byron R. Newton, Len Morgan, Beth Day, and others.

One hopes this shortcoming will be remedied in the other two volumes.

Early Air Pioneers, otherwise, is an engrossing book which should enjoy wide readership among all age groups.

In Addition. . . .

A survey of other volumes briefly reviewed by Maj. James F. Sunderman, USAF, Chief, Air Force Book Program.

From primary-source documents and personal interview with the flyers themselves comes a chronicle of transatlantic air adventure in the early days of flight. *Triumph: The Incredible Saga of the First Transatlantic Flight*, by Hy Stierman and Glenn D. Kittler (Harper, $4.50), begins on May 9, 1919, with the takeoff of three US Navy Curtiss NC Flying Boats, the NC-1, NC-3 and NC-4, from Long Island Sound at Rockaway Beach, N. Y. The trip for the NC-1 and NC-3 ended in squally weather on the turbulent surface of the mid-Atlantic. The NC-4 labored into Lisbon, Portugal, and on to Plymouth, England,

(Continued on page 103)

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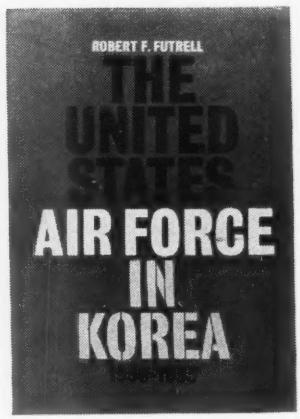

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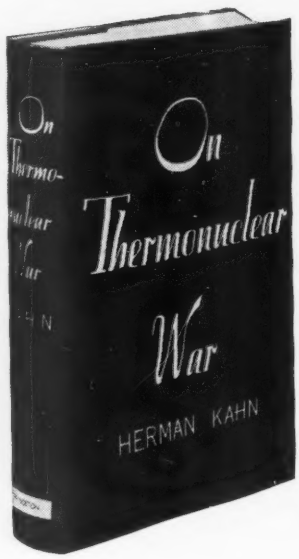

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